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Canadian Newsprint Problems Nearer Solution

R. O. Sweezey, of Montreal, Que., for Many Years Closely Identified With the Industry, Anticipates Complete Rehabilitation—While Detailed Plans of Individual Companies Are Not Revealed, Progress Made Is Reported to be Highly Gratifying and Definite Results Are Looked For In Near Future.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., July 8, 1935.—Apparently important happenings are occuring behind the scenes in the Canadian newsprint industry, for R. O. Sweezey, of Montreal, who for many years has been closely identified with the industry, has given out an interview to the *Montreal Herald* in which he states that the problems affecting the industry are today nearer solution than they have ever been.

"One or two gusts of wind may at any time bring about complete rehabilitation," said Mr. Sweezey, adding that it was impossible to make known the detailed plans of individual companies because any definite statement presumably would be an invitation to "the usual unwelcome racketeers."

He made it plain, however, that he is highly enthusiastic at the progress being made and said he looked for definite results in the near future that will place this important Canadian industry, torn for so many years by price-cutting, over-capitalization and other troubles, on a sounder basis.

With regard to Price Bros. & Co., Mr. Sweezey stated that there is no change in the situation. "The last offer made by Bowater Paper Mills, Ltd., of London, England, still stands," he commented, "and the matter is now up to the bondholders."

This scheme of reorganization it will be recalled, is believed to involve payment of back interest, now approximately $2,250,000, to present first mortgage bondholders, in new first mortgage bonds, interest on the entire first mortgage issue outstanding, after payment of back interest, to be paid from August 1 of this year.

Price Brothers creditors would, it is believed, be paid in cash, which would be forthcoming from the proceeds of a new issue of $6,000,000 in second mortgage bonds, to be underwritten by Bowater's, the balance after liquidation of creditors' claims to be applied to bank loans and to provide working capital. So far, it is understood, there is nothing more definite regarding the offer to preference and common shareholders.

Many sections of opinion believe that reorganization of Price Bros. & Co. will precede rehabilitation of other units in the newsprint industry.

Technical Men in Session

At the time of writing, the summer meeting of the Technical and Woodlands Sections of the Canadian Pulp and Paper Association is being held, Ottawa being the headquarters of the meeting.

With members of the Canadian Society of Forest Engineers as their guests, the members of the Woodlands Section made an excursion to Petawawa on Sunday, where they inspected work being done at the local forest experimental station, going over cutting areas and sample plots, and seeing the latest in fire hazard investigation work, as well as a demonstration of new logging machinery and equipment.

In the evening, papers were presented on forest fire hazard research and aerial photography, and informal discussions were held around a bonfire. The members slept in a tent camp and continued their inspection on Monday, held a meeting in the afternoon at which there were discussions on skidways, failures in logging dams, use of explosives in woods operations and forest management abroad.

The Technical Section on Monday morning visited the Gatineau mills of the Canadian International Paper Company, and later in the day there were meetings in the Chateau Saurier at Ottawa, at which papers were read as follows: "What Shall We Do With The Bark?" by K. S. LeBaron, Canadian International Paper Company, Three Rivers, and on "Refuse Disposal," by J. H. Mowbray Jones, Mersey Paper Company, Liverpool, N. S., F. L. Allen, the Dalhousie Mills, N. B., International Paper Company, W. T. Bennett, Gatineau Mills and J. Goodall, Provincial Papers, Ltd., Port Arthur.

For Tuesday joint meetings and functions were planned, these including visits to the plants of the E. B. Eddy Company and J. R. Booth, Ltd.

Later there were to be papers on "Wood Handling and Preparing" by H. Kennedy and J. W. Patterson, of the E. B. Eddy Company, with discussions to be led by G. Belcher, Gatineau Mills and C. Malcolm, of J. R. Booth, Ltd.

W. S. Kidd, of the E. B. Eddy Company, officiated as chairman of the Technical Section and W. A. Delahey, of the Canadian International Paper Company, Maniwaki, as chairman of the Woodlands Section. The secretarial work was performed by A. E. Cadman, of the Canadian Pulp and Paper Association.

Kimberly-Clark Resumes Dividends on Common

Maintenance of Rate Would Place Stock On 50 Cent Annual Basis—Current Dividend First Declared In More Than Two Years—Employees Compensation Measure Not Effective Until January 1, 1936—Further Changes In Law Anticipated Later.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., July 8, 1935—Resumption of dividend payments on the common stock of the Kimberly-Clark Corporation, Neenah, Wis., became effective July 1, when a 12½ cent quarterly payment was distributed to stockholders. Maintenance of this rate would place the stock on a 50-cent annual dividend basis. The current dividend is the first declared in more than two years.

Orders Lost Through New Tax

A law recently passed by the Wisconsin Legislature practically barring oleomargerine from sale in the state has had a retaliatory effect on the Marathon Paper Mills Company, Rothschild, Wis. The Menasha Products Company Division has lost recent orders for an oleomargerine package from which it had been realizing $240,000 a year. The bill, known as the Cashman bill No. 1058, increases the tax from 6 to 15 cents a pound on oleomargerine sold in Wisconsin. A flood of protests came to the Legislature when the bill was up for passage, largely from the cotton growers of the south, whose market for cottonseed oil would be affected. Retaliatory tactics were predicted if the "embargo" was created, and the cancellation of the above orders is one result.

Unemployment Compensation Law

Wisconsin's unemployment compensation law, which was to have been placed in effect July 1 will not be applied until January 1, 1936, under changes made in the law by the Legislature at its current session. Paper mills were among those establishing reserves required by the law, to reimburse those laid off through no fault of their own.

The law also has been simplified so it is not so complicated to administer. Weekly benefits are changed from the $5 minimum and $10 maximum to a $5 minimum with a $12.50 maximum for most employees, and a $15 maximum for skilled workers. Benefits formerly based on a monthly average will now be based on the annual average to simplify accounting. Eligibility requirements are also more clearly defined. One change is that employees receiving compensation must be residents of the community where employed. The Wisconsin Industrial Commission does not consider the law perfect, and contemplates further changes later.

Banta Addition Completed

Construction has been completed by the Banta Publishing Company, Menasha, Wis., on its single story addition 150 by 150 feet in size. The power, heating and sprinkler systems are still to be installed. Equipment from the bindery and shipping department are being moved, and additional presses are to be installed. This is the seventh enlargement since the original plant was constructed in 1911, and will take care of expanding operations.

News of the Industry

Nekoosa-Edwards Paper Company, Nekoosa, Wis., has constructed and put in place a new boom to keep ice and trash out of the water power racks in the power house. The boom is one of the largest ever constructed. It is four feet wide and 355 feet long, and is made of Washington fir timbers 40 feet long. It was constructed under the supervision of J. E. Walley, and replaces one destroyed by floods last spring at the south side hydro-electric plant.

One hundred and twenty students of the State Teachers' College at Oshkosh, Wis., made a tour of inspection recently of the Kimberly-Clark Corporation's mill at Kimberly, Wis. They are attending the summer session at the college, and were shown the entire process of paper making.

R. G. Armstrong, who has been associated with the E. D. LeRoy Advertising Agency at Appleton, Wis., for the last two and a half years, has accepted a sales position with the Long View Fibre Company, Long View, Wash. Mr. and Mrs. Armstrong are leaving July 13 for Long View to reside.

Try Injunction Suit Against Union Bag

[FROM OUR REGULAR CORRESPONDENT]

HUDSON FALLS, N. Y., July 8, 1935—Trial of an injunction action brought against the Union Bag and Paper Power Corporation by Amasa W. Howland, Richard J. Howland and M. L. Heidorf was concluded this week at an adjourned term of Supreme Court with Judge Ellsworth Lawrence presiding. Attorneys were given notice by the court to file briefs not later than August 1 and a decision will be given at a later date. The action was started here on June 17 and following testimony of witnesses for both the plaintiff and defense the terms was adjourned by Judge Lawrence. A similar action against the Union Bag and Paper Company was dismissed by the court at the hearing last month. The plaintiffs in the action seek to restrain the defendants from using flashboards on the Bakers Falls dam in the Hudson River several hundred feet south of the river bank and to recover damages alleged to have resulted from impounding the waters. They claim to own a section of the river bed between Bakers Falls and the mill dam. The defendant concern claim that they have the right under certain deeds of predecessors to impound the water and they also question the ownership of the property in question.

I. C. C. Findings In Paper Cases

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 10, 1935—C. E. Simmons, an Examiner for the Interstate Commerce Commission has prepared a proposed report for the Commission in the case of the Grimes Paper Stock Company against the Alton Railroad Company.

The Examiner found that rates on scrap or waste paper from Denver, Col., to certain points in Kansas, Missouri, Illinois, Iowa, Minnesota and Wisconsin are not unreasonable or unduly prejudicial. The complaint is recommended for dismissal.

A proposed report has also been prepared for the Commission by Examiner Leo Haden in which he found that the rate on newsprint paper, in carloads, from Ottawa, Ontario, Canada, to Jackson, Miss., is not unreasonable and the Examiner recommends that the case be dismissed. It was a complaint of the Jackson Traffic Bureau against the Alabama Great Southern Railroad Company.

Chicago Paper Market Displays Steadiness

Bonds, Ledgers and Sulphites Holding Up Well, Although Books and Covers Are Listless—Kraft Paper Section In Fairly Strong Position, Despite Light Request—Newsprint Paper Situation Virtually Unchanged—Paper Stock Shows Improvement

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., July 6, 1935.—As each week passes without any noticeable weakening in the local market structure, sentiment in local paper trade offices continues to improve. Demand has tapered off, particularly as the holiday season approaches, but there is sufficient quantity to indicate a belief that even the most pessimistic buyers of paper are not looking for any material break in prices.

Specifically, the local markets gave a good account of themselves during the week. Bonds and ledgers carried on in good shape, with sulphites reported as doing particularly well. Books and covers showed a definite slowing up as industry pauses before its Fall push, although the markets reported satisfactorily. Groundwoods tapered off somewhat in comparison with the previous week, but business in this line has shown gradual improvement over the early Spring developments.

Newsprint was virtually unchanged, the price situation continuing to be unsatisfactory and unsettling. Kraft markets were satisfactory although jobber and retail outlets encountered a lull in demand. Waste papers indicated activity of demand but there was plenty of supply locally. Some of the waste paper grades were on the verge of actual strengthening according to local commentators.

Illinois Legislature Closes

The Illinois Legislature closed a most turbulent but unproductive session on July 1 and members of the paper industry operating plants in Illinois—and paper distributors as well—are grateful that there were so few casualties in the way of legislation. The industry escaped two problematic bills in those covering workmen's compensation and occupational diseases. Women's eight hour legislation was also defeated.

Industry did get a minimum wage bill and a one day's rest in seven bill which will have some effect. The former provides for the setting up of a Board for the determination of minimum wages in certain industries. The State also passed an old age pension bill but it is doubtful if the bill will "hold water" in relation to Federal requirements.

Many bills pertaining to the licensing and taxing of various enterprises—all which would add materially to the cost of doing business—were either tabled, stricken from the calendar during the final hectic minutes or failed to pass. The boosting of the sales tax to 3 per cent was somewhat offset through laws which require registration of merchants to prevent fraudulent return and which require the bonding of peddlers under the law. Conditional sales legislation failed to pass.

Bills strengthening the fraudulent advertising laws, and of interest to the paper industry from both its own and the supply industries standpoint, were approved by the Legislature. The session was again indicative of the fact that Illinois has an excellent reputation as a fair state in which to do business—at least as far as taxation and regulation is concerned.

Occupational Sales Tax

Organizations, including members of paper and paper distributing firms, have recently urged purchasing agents of various concerns to assist their sales and executive departments in practicing a bit of the Golden Rule. Much of this urging has centered around the Occupational Sales Tax in Illinois. Manufacturers who sell articles not for resale are under the provisions of the sales tax and are forced to pay 3 per cent a month to the State. Their only opportunity to collect the equivalent of this amount is to add it as an expense item—inasmuch as the tax is not what is commonly known as a "direct sales tax" but a retailers occupational tax.

While sales and executive departments of certain concerns are showing the tax as a separate expense item and urging its payment, the purchasing agents of these same concerns are refusing to pay this "added expense" and adding the threat that "if it isn't removed they will buy elsewhere where the tax is not added." This, naturally, is bringing about a serious situation in Illinois inasmuch as 3 per cent represents a big slice of any semblance of profit for most concerns.

The paper industry is also hopeful that this compaign will have its effects in securing the cooperation of purchasing agents now most interested in beating down prices or in broadcasting rumors which will have that effect. There is no effort to criticize the majority of the purchasing agents in the entire program. Simply a desire to see this department of many businesses fully in understanding with the problems of the sales departments of the same concerns in their relations with other industries. The belief is that if the purchasing agents realize the problems of their sales departments they will assume a different attitude in relation to their own purchasers.

News of the Trade

The Standard Oil Company, 910 South Michigan Avenue, Chicago, has issued a booklet on the subject of industrial lubrication which should be of real interest to paper manufacturers—and to all manufacturers using paraffine wax. The booklet is one of a series on various lubrication subjects and bears the title "Wax in the Paper Industry." Specific treatment of the subject is a feature of this series and paper manufacturers will find the information unusually timely, according to the Standard Oil Company.

Eric A. Rohrer has been selected to direct the activities of the paper stock division of Bermingham & Prosser, paper merchants with offices in Chicago, New York, Cleveland, Kansas City, Kalamazoo and Grand Rapids. The announcement, coming from the Chicago office, states that "Mr. Rohrer has long been identified with the merchandising of fine papers. His wide experience and his practical knowledge concerning the requirements of the printing trades and the utilization of papers for the discriminating needs of the advertiser, are now available to all paper buyers." Bermingham & Prosser add that the acquisition of Mr. Rohrer to the staff is in line with an established policy, developed over a period of twenty years, to provide experienced sales representation and counsel for paper buyers.

Recent reports coming from the National Safety Council offices in Chicago show that Bird & Son, manufacturers

(Continued on page 54)

Canadian Paper Box Manufacturers Convene

Many Excellent Addresses and Papers Presented At Twentieth Annual Meeting Held In Quebec —Future Outlook for Industry Considered Fairly Promising—Luke P. Morrison, of Automatic Paper Box Co., Toronto, Ont., Elected President for Ensuing Term.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, July 8, 1935—Members of the Canadian Paper Box Manufacturers' Association have returned from the Seigniory Club in Quebec where they have just concluded the 20th annual convention of the organization. With delegates present from among the box manufacturers, supply men and board men representative of all the provinces, and a number of visitors from the United States, problems of the industry were discussed and a fairly optimistic view taken of its future. Reports indicated that while no great degree of prosperity had attended the operation of the paper box plants during the past year, there was reason to hope that the coming season would be more successful in the way of profits. Part of the time of the gathering was devoted to an excellent program of entertainment, the details of which were arranged by a capable committee.

Ontario and Quebec furnished the new officers for the association, with Luke P. Morrison, of the Automatic Paper Box Company, Toronto, as president; and W. J. Hampel, Brantford Paper Box Company, Ltd., as vice-president. Executive Committee, T. A. Moisan, of Dominion Containers, Montreal; G. E. Reid, Reid Bros., London, Ont.; Allan Manchester, Manchester-McGregor Paper Box Company, Toronto; F. W. Fisher, Fisher Paper Box Company, Toronto; managing secretary, C. V. Hodder, Toronto.

During the two days of business some excellent addresses and papers were listened to with profit. "Modern Methods of Producing Cartons" was handled by W. R. Walsmly of the Miehle Printing Press and Manufacturing Company, Chicago and others on the program were as follows: "Cost Reduction and Control," by Homer Dufresne, Montreal "As a Judge Sees It," by Justice Amedee Monet, Montreal; "Active and Supply Members," by Grattan O'Leary, editor *Ottawa Journal;* "Salesmanship and its Relation to Profits," by O. J. McClure, Chicago; "Cellophane and the Modern Package," by E. W. F. Gill, Canadian Industries Ltd., Montreal; "Standards and Grades of Board," by W. H. O'Reilly, Board Sales, Ltd., Montreal, "The Command of Money," by Normal McPhee, Toronto Type Foundry Company, Ltd., Toronto.

The chief recreative event was the contest for the Fielder golf trophy which was won by C. V. Brown, of the Galt Paper Box Company. The Hinde & Dauch trophy for horse shoe pitching was annexed by J. A. Northey, of the Telfer Paper Box Company, Toronto, and I. Good, Superior Paper Box Company, Kitcnener, Ont.

Extra Police in Pulp Strike Area

Some 1,700 pulpwood workers are on strike between Port Arthur, the Lumber Workers' Union at Port Arthur claims. The union demanded an increase of 75 cents per cord for cutting and peeling timber about two weeks ago. When the increase from the current $3.50 per cord rate was not forthcoming a general strike call was sent out. Timber operators, while failing to place a figure on the number of men on strike, declared the total was much lower than claimed by the union. Many men, they said, left the camp through fear of agitators.

Additional Royal Canadian Mounted Policemen and railway officers have been concentrated to guard against disturbances. Over the week-end the timber region between Nipigon and Schrieber was scheduled to be closed to any one who could not produce a permit to travel through the district. Thomas Falls, timber contractor, at whose camp at Ozone 250 men are on strike for higher wages and better camp conditions stated that the camps would be kept open and in order for a reasonable length of time after which, if men do not wish to return to work, they will be closed down permanently.

Load 1,200 Cords of Pulpwood

The barge *Salvas* was loaded at Hog Island, Manitoulin, last week, with 1,200 cords of pulpwood, being the largest barge to be taken from the Manitoulin district in some years. The shipment was made by Captain R. L. Graham to an American port. Paul Porte, large pulpwood buyer whose territory covers a wide portion of Ontario, stated that the scale of wages paid on Manitoulin Island and vicinity was one-fifth higher than anywhere in the Dominion. At Pembroke the scale for cutting and peeling was $1.60; Sturgeon Falls, $2.00, and on Manitoulin, $2.50.

Paper Mill Wages Settled

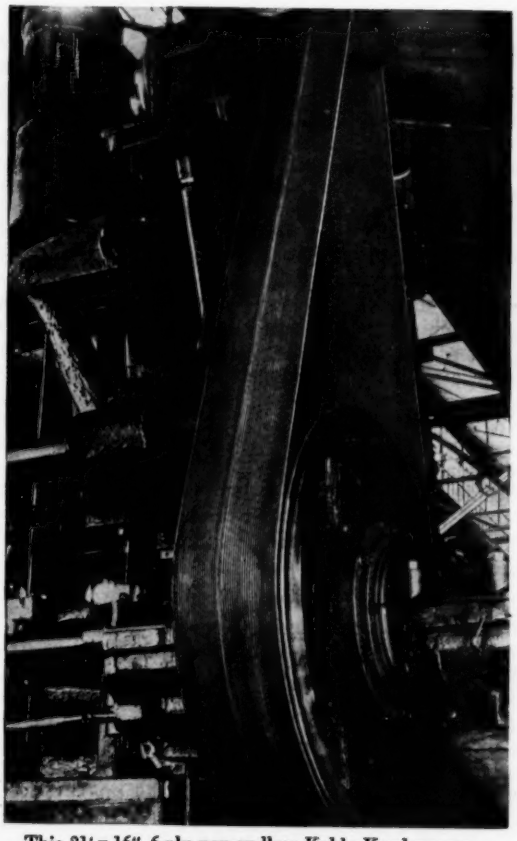
Represenatives of the Great Lakes Paper Company, of Fort William, and of union mill workers of Ontario and the United States in conference at the Kink Edward Hotel, Toronto, agreed to continue the existing wage agreement until May of next year. The same agreement has been reached between union officials and representatives of the Abitibi Power & Paper Company, Provincial Paper Company, aind the Ontario Paper Company. Union representatives asked that the rate be increased by 2 cents an hour, from 43 to 45 cents an hour. It is understood that negotiations will be carried on at a later date between the union men and representatives of nine other paper companies concerned.

Notes and Jottings of the Trade

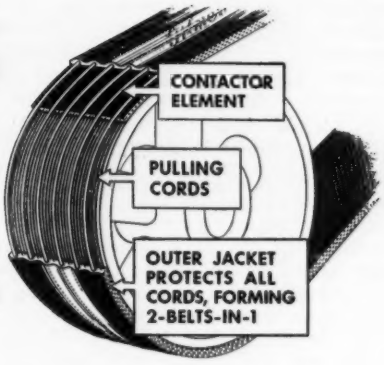
A Government bill amending the Marketing Act was before the House of Commons at Ottawa this week for second reading. The main change would extend the act to cover the pulp and paper industry. Before leaving Toronto following wage conferences Matthew J. Burns, Albany, N. Y., president of the International Brotherhood of Paper Makers said, "Wage schedules have been fine. We would like some changes, if we could get them, of course, but they could only be had with the approval of employers and employees. We don't want to do anything to put the industry in an unsound position. Anything in the way of an increase that can be obtained will mean cutting some place else, I suppose. There has been no change in the price of paper, but we would like to increase the workers' purchasing power where possible."

Don Valley Paper Mills, Toronto, have completed some extensive alterations and improvements to the machine room which are designed to give added storage room for paper. Mr. Dobbie, of Carmichael & Co., Sydney, Australia, was calling on Ontario newsprint mills last week. He stated that business in most departments in Australia had undergone considerable improvement of late.

Here's why KABLE KORD grips flat pulleys



This 21' x 16", 6-ply non-endless Kable Kord proves its worth in severe duty on a huge forming press, having a speed reduction of 9 to 1. When starting the drive, the Kable Kord—always taut—defeats the tendency of ordinary belts to fly off the driver pulley.



PRESSURE is responsible for the sure grip of Kable Kord Flat Belting on flat pulleys. Kable Kord is "two-belts-in-one". The lower section, consisting of pulling cords, transmits the load. The upper Kable Kords, acting as a "contactor", squeeze the pulling cords snugly against the pulley. So, pressure gives Kable Kord, on flat pulleys for group drives, short centers and pivoted motor bases, *more pull per square-inch than any other flat belt made.*

A Gilmer Engineer will be in to see you soon. Let him give you the complete Kable Kord story. Today, write for the Kable Kord Data Book. It's free.

L. H. GILMER COMPANY, Tacony, Philadelphia

KABLE KORD'S ADVANTAGES

1. Made endless and in rolls
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3. Reduces slipping
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5. Is more flexible
6. Has inherent ruggedness
7. Has more pull per square-inch
8. Wears longer
9. Requires no belt dressing

Gilmer BELTS

GILMER V-BELTS

... are as efficient on V-drives as Kable Kord is on flat pulleys. They're rugged, slipless, flexible and cool-running. You can depend upon them to deliver maximum power. Sold in standard stock and special sizes to fit any make or size of drive.

Manufacturers OF COMPLETE LINE OF POWER BELTING

V-belts · Kable Kord Roll and Endless Flat Belting · Planer Belts · Speedage Endless Fabric Belts · Cone Belts
Roving Frame Belts · Moulded Rubber Belts · Winder Belts · Spinner Belts · Refrigerator and Washing Machine Belts
Conveyor Belts · Round Roll and Endless Fabric Belting · Endless Belting · Endless Cotton Belts · Laundry Feed Ribbons

SPECIALISTS IN QUALITY BELTS SINCE 1903

TAPPI to Visit Mills Near Philadelphia

Plans for the activities of the first day of the TAPPI Convention in Philadelphia on September 18 are rapidly taking form.

The problem of the TAPPI Fall Meeting Committee is not to find things to show to the Technical Association members attending the convention, but rather out of the multitude of attractions offered, to select those which the committees feel would be most likely to interest the visitors.

Historic Philadelphia

Philadelphia is fortunate in its development as it stands almost preeminent in points of historical interest, manufactories of all kinds, museums, institutions of learning, laboratories, libraries, etc. The Committee has endeavored to arrange for every possible interest and taste but if any of the members desire to go through a particular plant, laboratory or institution, the Delaware Valley Section Committee will be only too happy to make the necessary arrangements if the members will communicate with C. M. Connor, Valley Forge Laboratories, West Conshohocken, Pa.

Mr. Connor, Chairman of the Philadelphia Subcommittee, has arranged for tours to paper mills, points of historical interest, trips to industrial plants, visits to educational institutions, that will satisfy any taste for professional knowledge or purely historical enlightenment.

Arrangements have been made for visits to the large Container Corporation plant at Manayunk on the outskirts of Philadelphia, and to the splendid Dill and Collins Company mill, also in Philadelphia. The McAndrews and Forces Company plant in Camden, N. J. just across the river from Philadelphia has also extended an invitation to the visiting delegates.

Points of interest that may be visited by those who want to take advantage of this opportunity to increase their knowledge of the places and things that played such an important part when this nation was being formed include such interesting points as Independence Hall, Carpenter's Hall, Betsey Ross House, Penn Treaty Park, and Rittenhouse Mill site.

Points that are neither of commercial nor purely historical interest, but nevertheless of most fascinating interest to many people are the United States Mint, located in Philadelphia, the splendid U. S. Navy Yard and Naval Aircraft Factory. The new post office in Philadelphia which was just opened for business, is considered the best post office in the world, and outside of its architectural beauty is of tremendous interest to technical men as it illustrates the ingenious devices resorted to for the quick and efficient handling of the mails. This post office can receive mail from train, truck, boat and airplane. The new United States Customs House just completed, is also very much worth while seeing.

Many industrial institutions will be glad to welcome the delegates. Trips will be arranged for seeing the Curtis Publishing Company, Cuneo Press and also the Public Ledger.

If any of the members are interested, a tour to the Franklin Refining Company, large sugar refiners, can be arranged.

For educational tours, visits to the Academy of Natural Science in Philadelphia will prove of deep interest and a trip through the Franklin Institute and Planetarium is one thing that certainly should not be missed.

The Planetarium is one of three in the world. It portrays the heavens as they are seen on any clear night with the motion of the planets in their proper relative periods. The whole procession from sunrise to sunrise is shown dramatically and carefully explained by the instructor in the short period of fifty minutes.

On this first day of the Convention there will also be visits to Wilmington, Del. where J. C. Dieffenderfer have charge of the tour through the Hercules Powder Company Experimental Station.

At the plant of Pusey & Jones Corporation, also in Wilmington, there will be at the time of the convention, a paper machine of fair size under construction for the inspection of the visiting TAPPI members.

A tour also will be arranged to see the splendid Du Pont Experimental Station at Henry Clay just outside of Wilmington.

The Hotel Pennsylvania in Philadelphia will be the Philadelphia Headquarters for the Convention. Members who decide to arrive a day or two earlier than the official opening of the Convention will find it convenient to stop at the Hotel Pennsylvania from where all the Philadelphia activities will radiate.

Vacation Plans

More and more the idea is growing that due to the very reasonable rates that the Ambassador Hotel in Atlantic City is making to the Technical Association, it will be an excellent plan to combine one's vacation with attendance at the convention. The suggestion has been made to arrive at Philadelphia several days earlier than the convention to be sure to do all the sightseeing possible in this area and then move down to Atlantic City on Wednesday night and after the Convention finish up a lovely vacation at Atlantic City.

All the activities centering around Philadelphia will be in small groups so that there will be practically individual attention and consequent greater enjoyment by the visitors.

Swedish Kraft Production

Swedish kraft paper production during the first quarter was reported to be at the usual rate, although exports, amounting to 32,886 tons, were approximately 1,500 tons below those for the first quarter of 1934, and nearly 3,000 tons under exports during the last three months of 1934. Business in kraft paper improved considerably for the Swedish mills the last half of January compared with the dull weeks which followed the holidays. The devaluation of the Belga in March was stated to involve some loss to the kraft mills as sales to Belgium had been contracted exclusively in Belgian currency. Orders at the Scankraft mills were reported to have increased slightly by the middle of March.

Business in chemical pulp was practically at a standstill in Sweden during the first two weeks of the year when the mills were engaged in taking stock. Further interference with the smooth flow of trade was anticipated in the announcement of a tightening down on imports into Italy and the application of import quotas by Spain. Exports of both bleached and unbleached sulphite during the first quarter were somewhat better than during the corresponding period in 1934. By the middle of March it was stated that orders on hand for sulphite pulp were nearly equal to the shipments for the entire year of 1934.

Efficiency Formula for Worm Gears Verified by Input-Output Test

Widely varying, and frequently quite erroneous, opinions are held concerning the efficiency of worm reduction gears, although the quietness, simplicity and reliability of such gears are generally recognized. The engineers of the Worm Gear Department of the De Laval Steam Turbine Company, Trenton, N. J., recently having occasion to test the efficiency of two gears of the design shown in the illustration, obtained results which are in close agreement with a simple formula for the efficiency of such gears, as given later in this article. The two gears were identical in construction, having what is known as D Frames, with the worm at the bottom. The worm shafts were supported in ball bearings, while the wheel shafts were supported in sleeve bearings. The worms were of hardened steel and ground, and the rubbing surfaces were lubricated by the slash system. The principal dimensions were as follows:

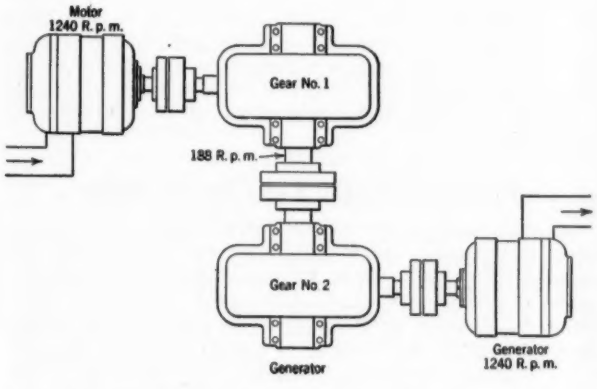
Distance between centers—10.25 in.
Circular pitch of worm wheel—1.6718 in.
Ratio of transmission—6-3/5.
Helix angle—43 deg. 10 min.
Number of threads—5

One as Step-Down and the Other as Speed-Up Gear

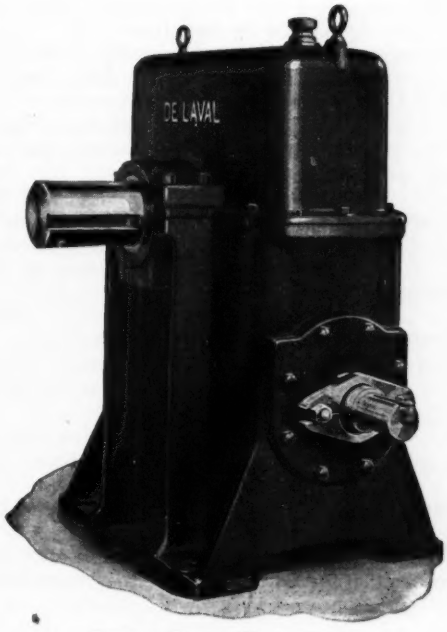
The two gears were coupled together, one as a step-down gear and the other as a speed-up gear. A calibrated motor from the De Laval pump test room was coupled to the worm shaft of one gear, while the worm shaft of the other gear was coupled to a similar calibrated motor used as a generator, the wheel shafts of the two gears being coupled together and the efficiency of the gears determined by measuring the electrical power input and output. The efficiencies of both motor and generator were known from previous tests, but were also checked by computation of the stray loss and of the I^2R loss for each unit.

Combination Run at Full Load for Eight Hours

The combination was first run at full load for eight hours until the oil in the gear casings had assumed a constant temperature, upon which the electrical input to the motor, the electrical output from the generator, the room temperature, and the temperatures of the oil in the reservoir of the two gears, were taken, the figures being as follows:



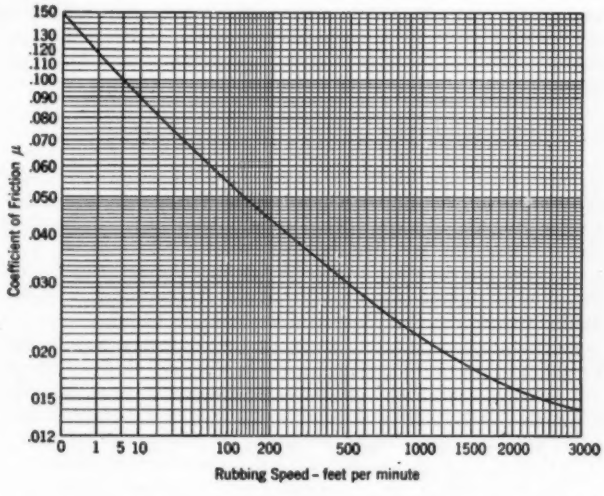
ARRANGEMENT OF MOTOR DRIVING GENERATOR THROUGH STEP-DOWN AND SPEED-UP WORM GEARS.



BOTTOM DRIVE WORM GEAR.

Speed of motor and of generator	1240 r.p.m.
Speed of wheel shafts	188 r.p.m.
Electrical input	44.472 kw.
Motor efficiency	87.5 per cent
Power input to No. 1 gear	52.1 hp.
Electrical output of generator	31.0 kw.
Efficiency of generator	87.0 per cent
Power output from No. 2 gear	47.7 hp.
Temperature in No. 1 gear	190 deg. F.
Temperature in No. 2 gear	160 deg. F.
Room temperature	57 deg. F.

Obviously, the combined efficiency of the two gears in tandem is 47.7 divided by 52.1, or 91.54 per cent. The power losses in the individual gears appear as heat. As



COEFFICIENT OF FRICTION AS A FUNCTION OF RUNNING SPEED.

the two gear cases are of exactly the same size, shape and condition of surface, and as the loss of heat in still air at low temperatures varies directly as the difference in temperature between the hot body and the surrounding air, it may be assumed that the losses were distributed between the two gears in the same proportion as the temperature rises, which were 133° F. for gear No. 1, and 103° F. for gear No. 2, the smaller loss in gear No. 2 being attributable to the fact that it had been run previously, while gear No. 1 was then being run for the first time.

Representing the efficiency of gear No. 1 by x and that of gear No. 2 by y, we then have $\frac{52.1\ (1\text{-}x)}{52.1\ x\ (1\text{-}y)} = \frac{133}{103}$ also $52.1 \times y = 47.7$, from which $x = 95.3$ per cent and $y = 96.13$ per cent.

To verify these results, the test was repeated with the power applied in the reverse direction, the efficiency x for gear No. 1 thus found being 95.8 per cent, while y for gear No 2 was 96.7 per cent. Both gears showed improved efficiencies in the second test, as both had then been run more and the worms consequently had seated more perfectly in the bearing surfaces of the worm wheels. These tests, therefore, confirm the commonly accepted belief that worm gears improve materially in efficiency during the "running in" process.

A commonly used empirical rule for estimating the percentage efficiency of a worm gear is to subtract one-half of the ratio from 100. Thus, $100 - \frac{6\text{-}3/5}{2} = 96.7$, which is an excellent approximation in the present case. A more rational formula for efficiency with the worm driving is

$$\text{Efficiency} = \frac{\tan L}{\tan (L \text{ plus } 1)}$$

and with the wheel driving—$\text{Efficiency} = \frac{\tan (L\text{-}1)}{\tan L}$

L being the helix angle and 1 the angle of friction, equal to the angle whose tangent is the coefficient of friction.

The accompanying chart showing coefficient of friction as a function of rubbing speed is taken from a recent paper by Dr. H. E. Merritt, of England. In the present case, the rubbing speed at the pitch line figures out as 1259.6 ft. per min., for which the chart gives 0.0197 as the coefficient of friction. Applying this value for gear No. 2 with the worm driving, as in the second test, the efficiency by formula comes out as 96.57 per cent, which is sufficiently close to the value 96.7 calculated from the test results. It is to be expected that gear No. 1 will approximate the same value after more extended running.

Boston Paper Trade Happenings

BOSTON, Mass., July 8, 1935—The office of the Code Authority of the Paper Distributing Trade, the Regional Committee of the first Region and the various Trading Area Subcommittees has been closed.

A luncheon meeting of the Wrapping Paper Division of the New England Paper Merchants Association is to be held Tuesday at the Boston Chamber of Commerce.

Frank C. Herrick, in charge of the Boston office of the Columbian Rope Company, gave a general discussion of the products of that company at a sales meeting at the office of Carter, Rice & Co., Corp., June 29, furnishing very helpful ideas as to methods of selling twine more effectively. Frank H. Winter, sales manager, presided.

The Fort Hill Paper Company will be closed Saturdays during July and August.

Boston Paper Market Quiet

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., July 8, 1935—Boston paper merchants transacted a moderate amount of business last week, in consideration of the holiday and the summer season. The demand for fine paper was hardly better than fair. Many consumers of fine paper, kraft and specialties, such as textile, shoe and chair manufacturing establishments and others were closed, so that houses supplying these mills, particularly wrapping paper firms, found business rather slow. Some houses dealing in kraft papers had a pretty fair volume of sales. The call for box board was fair.

A few grades of paper stock were fairly active, with some showing an advancing tendency, although in general the influence of the summer season and the holiday was felt. Many mills, especially the box board mills, were closed for the week on account of the holiday. A large number of purchasing agents were on vacations, so that, as a whole, selling was rather difficult. The demand for mixed paper was sustained, in fact increased, with a scarcity resulting and the price continuing at .20 @ .22½. There is a smaller spread than usual at present between mixed papers and old newspapers, so that, according to the trade, mixed papers are now containing a considerable quantity of old newspapers. Other grades of old papers were fairly easy. Bagging was in fair demand, with foreign gunny No. 1 quoted at 1.85 and an advancing tendency prevailing for this commodity. New domestic rags moved fairly well. Soft unbleached declined fractionally on the lower side of the range, being quoted at .05⅞ @ .06½, compared with previous figures, .06¼ @ .06½. Old domestic rags moved to a certain extent, as well as foreign rags.

Schroon River Makes Improvements

[FROM OUR REGULAR CORRESPONDENT]

WARRENSBURG, N. Y., July 8, 1935—A portion of the equipment at the Schroon River Pulp and Paper Company has suspended operations to allow for improvements and replacements at the plant. Among the improvements being made are the installation of new beaters in order to enable that department to rank with the efficiency existing in the other sections. Several other machines are also to be replaced and a new concrete floor installed. Employees of the company are making the repairs as far as possible and the work is expected to consume several weeks. Grinders at the plant are running day and night with prospects of continuing indefinitely and an extra supply of pulp is being stored in the yards. An official of the company reports orders for future delivery which will guarantee steady operations for some time. Since reopening several months ago after a long shutdown the plant has operated day and night with a number of shifts and a business boom has resulted in this section inasmuch as a majority of the residents are dependent upon it for a livelihood. Franklin E. Pasco is supervising operations of the reorganized concern.

France Imports Less Wood Pulp

WASHINGTON, D. C., July 10, 1935—French imports of wood pulp during the first quarter totaled only 123,439 metric tons, a decline of 7 per cent compared with the first quarter of 1934. The reduction was confined to mechanical pulp, receipts of chemical pulps having held steady. Sweden was the chief source of supply for these importations, followed by Finland, Norway, and Germany. Imports from the United States amounted to only 158 tons and from Canada 2,224 tons, mostly bleached sulphite.

Some Pointers On Plant Maintenance Painting

By Roy C. Sheeler[1]

Adequate maintenance of industrial plants, institutions, office buildings, etc., was never more important than at present. During the past few years, it has been the exception rather than the rule to find all surfaces, especially the exterior, in good repair. Maintenance forces have been cut down to the bone; plants usually maintaining their own painting crew proceeded to get along without them or with a skeleton organization. As a consequence, surfaces that would normally have received one or more coats of paint were left to take care of themselves for a while or until a healthier business state was developed. Wood surfaces were hungry and thirsty for paint protection, the fibres covered but thinly, or totally exposed. The toll taken by the demon rust on metal surfaces has been enormous. With the gradual pick up in business, there has been also a quickening to see the need of more paint protection. But in the attempt to catch up with the painting program, there are several important points that should be observed.

Beware of cheap paints. With money being none too plentiful, there is always the temptation to look too largely at the price per gallon. It is rarely if ever the case that paint bought on the lowest price basis gives satisfactory surface protection. It is often porous, allowing moisture to penetrate through it and attack the surface beneath. It wears away very quickly, making repainting come more often than it should. And when it does fail, the failure is often by cracking and peeling, thus needing complete removal by burning or other means before the new coat of paint can be applied.

Don't try to cover a badly weathered or bare surface with only one coat of paint. By so doing, the paint cannot be thinned sufficiently with linseed oil, turpentine, or other prescribed thinners to satisfy the condition of the surface. The oils that are in the paint are immediately absorbed by the porous condition of the surface, leaving nothing to hold the particles of pigment together. Early failure is inevitable. Such surfaces should receive a minimum of two, preferably three coats of paint, the first coat liberally reduced so that the absorptive character of the surface is fully satisfied. The intermediate coat should not require as much reduction, and the elements to be added should be such as will "flatten off" the paint when dry. Then the final coat will secure the required adhesion. It should usually be applied just as received in the can after thorough stirring.

Don't slight surface preparation. This is especially true concerning badly rusted metal surfaces. A wire brush, a chipping hammer, or one of the several kinds of revolving devices for rust removal is a prime requisite. The mistake of painting over rust will quickly become apparent in scalding and peeling of the film. When rust is removed down to a firm solid surface, don't overlook the value of a recognized rust-inhibiting primer. This type of undercoat is most essential prior to the application of the intermediate and finishing coat. Often the early failure of paints when applied to metal surfaces may be traceable to the complete omission of the primer or to the use of an inferior article. There are many types of primers available, made by responsible manufacturers, each of which is intended to meet a prescribed surface requirement. Be sure to obtain the correct one for the surface in question.

When it comes to priming and finishing coats, it should be borne in mind that the paint industry has not stood still during this depression period. Research and development and product improvement have proceeded to the point where very superior products are available. This is especially true in the field of synthetic finishes. It is truly remarkable what outstanding products are ready for your use in this class of material. Paints and enamels are here which a few years ago were undreamed of. Abnormal surface requirements can now be met with splendid performance resulting.

So, if you have a surface protection problem, put it up to your responsible paint manufacturer. You may be surprised how well your needs may be met.

[1] Paint Engineer, E. I. du Pont de Nemours & Co., Inc.

Rockton Paper Mill to Reopen

ROCKTON, Ill., July 8, 1935—At one time three paper mills flourished in Rockton, but as the years passed the three dwindled to one, operated by the American Tar Products Company, which in 1927 ceased operations, leaving the village devoid of activity and dependent on farm trade alone for its sustenance.

Six weeks ago Rockton's relief rolls were cleared with the employment of nearly every available worker in town on the remodeling and conditioning of the deserted paper mill on the banks of Rock River.

President A. E. Sandroff of the Thomas Paper Stock Company of Chicago announced the formation of the Rockton Felt and Paper Company of which he was also to be president, with M. H. Glass of Chicago as manager and J. P. Furlong, veteran paper maker of Joliet, as superintendent. The company, he announced, would specialize in the manufacture of dry felt, roofing felt products, and building papers.

With the arrival of Glass and Furlong, the residents of Rockton realized there was no speculation in Sandroff's announcement and proceeded to go to work.

Formerly operated by water power, the entire machinery of the plant is being motorized and will be operated by electricity. Obsolete features are being replaced and a crew of carpenters, machinists, millwrights, and skilled workmen are busy preparing the plant for operation.

When repairs have been completed the plant will compare in size and capacity with the usual mills making such products, few in the country being larger. A regular production of 25 tons of paper a day is planned, with the plant working 24 hours a day 6 days of the week, using three 8-hour shifts daily. With marketing conditions improving, it is planned to increase the capacity of the mill.

Policy of the new Rockton Felt and Paper Company will be one of expansion and development, utilizing local employees, Sandroff announced.

Officials are optimistic over the company's future due to the low prices of raw materials used in paper making and the heavy demand for building products. Repairs of homes and new constructions, long delayed during the depression, are cited as factors in the brightened outlook.

Obituary

H. D. Fillmore

BENNINGTON, Vt., July 4, 1935—Major Henry D. Fillmore, last surviving member of Fillmore & Slade, paper manufacturers, died last night at his home on Pleasant street. He had been confined to the house for several months. Born in Old Bennington 72 years ago, he was a son of Elijah D. and Areanna Thayer Fillmore. He attended Yates Seminary, at Old Bennington, and became associated with the late Olin Scott, manufacturer of pulp grinders and gunpowder machinery. He was with the machine works for forty-seven years.

For ten years he was captain of Company K, Vermont National Guard, and when the State troops were reorganized at Camp Olympia for participation in the Spanish-American War he became major of the regiment. He was at Camp Chickamauga and retained his connection with the regiment for a long period after the close of the war.

He was three times married and is survived by a widow, who was Mary Newcomb of Johnsonville, N. Y., and a daughter by his first marriage, Mrs. John McKeon. He also leaves a sister and two brothers.

Walter W. Bourne

QUINCY, Ill., July 6, 1935—Walter W. Bourne, 815 Vermont street, widely known in Quincy, veteran salesman and one of the stockholders in the Irwin Paper Company, died in Quincy Memorial sanitarium recently after an illness of several months. News of his death was received as a shock by his many friends, as few realized his condition was serious.

Mr. Bourne was the son of Mr. and Mrs. James Bourne and was born in Kingston, Ont., Canada, January 19, 1858. He was married to Mrs. Augusta Ross Holton in 1884 in Belleville, Ont. He came to Quincy in 1893 and had lived here since. He was connected with the Irwin Paper Company forty years, until his retirement in 1932.

Mr. Bourne spent practically all of his time as a salesman for the company. He was interested financially in the firm and was held in high esteem by his fellow workmen, especially by Leaton Irwin, head of the company.

As a member of the Central Baptist Church, Mr. Bourne was active in its affairs, having served as moderator and as chairman of the board of deacons for many years.

Surviving are his son, Arthur Bourne, Quincy; a stepson, E. W. Holton, Sarnia, Ont.; a step-daughter, Mrs. S. L. Elberfeld, Boston, Mass.; a brother, John Bourne, and three sisters, Annie and Jennie Bourne and Mrs. Robert Wallace, all of Kingston, Ont., and two grandchildren, Jack Ross Bourne, Quincy, and Jane Bourne, Portland, Ore.

James Berry

[FROM OUR REGULAR CORRESPONDENT]

TAUNTON, Mass., July 8, 1935—James Berry, for many years president of the Berry Paper Stock Company, Inc., died Friday at his residence, 31 Cedar street. Mr. Berry suffered from an illness last October, from which he never fully recovered. He was widely known in the trade, doing an extensive business in waste paper, as well as in iron and other metals.

Mr. Berry was born in County Cavan, Ireland, coming to this country about fifty years ago. For a number of years he was foreman of the Clem's Teaming Company. subsequently founding the Berry Paper Stock Company some 40 years ago.

There are living two daughters, Ann H. Berry, of Taunton, and Mrs. John Moran, of Fall River, Mass.; three sons, Charles, of Taunton, and James F. and Thomas O., of Boston; a brother, Thomas Berry, of New York City; and a sister, Mrs. Mary A. Little, of New York. The funeral was held at his late residence this morning, with a solemn high mass of requiem at St. Mary's Church.

George Otis Rockwood

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., July 8, 1935—George Otis Rockwood, president of the General Fiber Products, Inc., and of the Rockwood Manufacturing Company, makers of paper pulleys and other paper products, died late last week in St. Vincent's Hospital here. He had been ill a month, but his condition was not considered critical until shortly before his death.

He was born in 1872 in Chattanooga, Tenn., but had lived here since childhood. He was a graduate of Purdue University and as one of the country's outstanding engineers contributed several important inventions to the industrial world. The Rockwood Manufacturing Company was founded by his father, William E. Rockwood, about fifty years ago after the elder Rockwood discovered that pulleys could be made from paper. The company increased its manufacturing capacity until it became one of the largest plants in the city.

General Fiber Products, Inc., was organized eight years ago as a part of an expansion program of the parent company. About that time the Ohio Valley Pulley Works was merged with the local plant.

Mr. Rockwood is survived by the widow and one daughter, Princess Diana Rockwood Eristavi-Tchitcherine. He was a member of the University Club and the Indianapolis Country club here.

Cornelius M. Wertz

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., July 8, 1935—Cornelius M. Wertz died on Saturday morning at his residence along the Manchester-York Haven Highway, near York. His death was due to a complication of diseases. Mr. Wertz, who was 60 years of age, was born in lower York county, the son of the late Jacob and Glorisa Allison Wertz. He resided at his present home for a period of twelve years and, previously to that time, was a resident of York Haven.

For more than forty years he was employed as foreman by the York Haven Paper Company and was widely known to those in the trade. Mr. Wertz was a member of St. Paul's Lutheran congregation of York Haven. He is survived by his wife, Cora Sheets Wertz, and a son, Melvin S. Wertz.

Joseph G. Wagner

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., July 1, 1935—Stricken with heart disease while on his way to work, Joseph G. Wagner, 45, engineer at the Thilmany Pulp and Paper Company, Kaukauna, Wis., died June 25. He had resided at Kaukauna for twenty-five years, and was buried in Holy Cross cemetery there.

R. O'Donoghue Joins Oliver Filters

Effective August 1, 1935, Oliver United Filters Inc., New York, Chicago and San Francisco, announces the addition to its sales staff, paper and pulp division, of Roderick O'Donoghue. Mr. O'Donoghue has long been identified with the paper industry, having been associated with the International Paper Company for the past 20 years.

The First Paper Mill in America

Almost two and one-half centuries ago (to be exact, 245 years) in the year 1690 William Rittenhouse built the first paper mill in the United States. This was 38 years before any other paper mill was built in this country. The first mill was built on the banks of the Wissahickon, now in Fairmount Park, Philadelphia.

William Rittenhouse (Wilhelm Ruddinghausen) was born in Germany, was a Mennonite minister but as the community of Germantown to which he had immigrated was hardly large enough to maintain the pastor, he had to depend on his expert knowledge of paper making to support his family.

The making of paper in America had some rather decided advantages as the importation from Europe was slow, risky and costly. The vessels of those days were but small ones, and it took them two months and more to make the crossings. The boats being small, the time for passage long, and the risks from pirates in addition to the natural hazards of sailing in those primitive craft, made the cost of paper laid down in Philadelphia extremely high.

Accordingly, when William Rittenhouse having no funds of his own, decided to form a company for the purpose of building a paper mill, he had no particular difficulty in enlisting the aid of William Bradford, the printer, and others, to furnish the capital to build the mill and to make arrangements for the land. For one reason or another the other partners dropped out until 1706, William Rittenhouse was the sole owner.

Certainly, Mr. Rittenhouse could not complain of heavy overhead charges when one notes that he had a lease on the ground for 990 years and that the annual rental was 5 shillings Sterling, money of England. And he did not need steam flowmeters to check his power costs, nor did he need to worry about a heat balance. His power plant was simplicity itself, merely a primitive water wheel.

Due to his skill and thriftiness, William Rittenhouse was successful from the start. Among the advantages mentioned before he had no local competition, competition from England and Europe was difficult. He had the further advantage that he had a good local supply of rags, since the German and Dutch colonists who settled in Germantown built up quite a respectable spinning industry.

Incidentally, even in those days paper came under the heading of munitions of war, as we read that due to the necessity of plenty of paper wads for the muskets, all men who were skilled in the art of paper making were exempted from military service.

The paper maker of those days would not have known what to do with the NRA. He was used to working from 6:00 A. M. to 6:00 P. M. six days a week and the pay was $1 per day for an ordinary workman and $1.25 per day for a particularly skilled artisan.

One can not help but admire the courage and hardihood and daring enterprise of those early business men. We worry now about the devaluation of the dollar, and being off the gold standard, but in those days they had almost as many different kinds of money as they had different settlements, and yet William Rittenhouse had the courage to sell, and William Bradford the courage to buy paper on a contract to extend for ten years, seven reams of printing paper and two reams of writing paper to be delivered per year, 10 shillings per ream for the printing paper and 20 shillings per ream for the writing paper. Price of brown paper, 6 shillings per ream.

William Rittenhouse operated this mill for 11 years until high water in the Wissahickon swept away the mill. The following year the plant was rebuilt but at a little distance from the site of the old one. Later on, a third mill was built by one of his descendants. This last mill stood until 1891 when the property was acquired by the Fairmount Park Commission by whom it was demolished.

The then owner of the plant, Mr. Balfour decided to remain in the paper making business so after looking around, he secured the present site of the Delaware Paper Mills, near Richmond and Tioga Streets, which is now the Dill & Collins plant.

It would take a great deal more space than is allotted for this purpose to tell of the early romance of the paper making business, but one of the outstanding points is the direct lineal descent from the small crude mill in 1690 on the Wissahickon to the splendid large plant of the present Dill & Collins Inc.

Official Headquarters

The headquarters for the fall meeting of the Technical Association of the Pulp and Paper Industry will be the Ambassador Hotel, Atlantic City, N. J., September 18 to 21, 1935. Reservations should be made directly with the hotel and the best assignments to rooms will be made in the order of receipt of reservations. There has been a large early registration.

Would Insure Mills Steady Operation

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., July 8, 1935—Prominent business men claim that the granting by the government to the Black River Regulating Board the appropriation it seeks for construction of the Panther Mountain Reservoir would mean incidentally that after completion of the project a huge sum would be spent by private interests in developing the rest of the Moose River. Construction of the reservoir would also allow paper mills along the Black River to run steadily and they would not be forced to suspend operations during the low water periods of the summer months which have proven a handicap. It is contended here that industries along the river such as the Gould Paper Company and the Niagara Hudson Power Company have recently noticed an increase in power consumption and with the return of normal business conditions it is felt that the construction of the reservoir at an estimated cost of $3,750,000 would mean building of power plants and increased industrial activity. The proposed project has for its primary purpose the provision of flow regulation, for the more economic and efficient development of power, although it would result incidentally in flood control benefits regarded important now by the federal administration. The proposed dam for the reservoir would be 1,800 feet long and 175 feet high similar in construction to the Conklingville project which has already proved beneficial to industries along the Hudson River. It was intimated also that contract would undoubtedly be made with the Black River Regulating Board for return to the government of such revenue as may be realized from the operation of the proposed reservoir from the generating of power.

Paper Production in Japan

Production of foreign-style paper by mill of the Japan Manufacturers' Association totaled 204,514 short tons during the first quarter of 1935, with total sales for the period amounting to 201,170 tons. In comparison with the corresponding quarter in 1934, there were increases of 20,314 tons, or 11 per cent, in production, and 15,403 tons or 8 per cent in sales. The largest item of production was newsprint paper amounting to 86,971 tons. Prices were steady throughout the quarter, owing to the control exercised by the Association.

Government Paper Bids and Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 10, 1935—The Government Printing Office has received the following bids for 10,000 sheets of 22x28 gray photo mount board; Mathers-Lamm Paper Company, at $39.66 and $37.75 per M sheets; Reese & Reese, Inc., $39.86; Whitaker Paper Company, $38.13; R. P. Andrews Paper Company, $39.40; Charles W. Speidel & Company, $39.50; Charles G. Stott & Company, $37.70; Barton, Duer & Koch Paper Company, $39.86; Enterprise Paper Company, $48.54 less 3 per cent; George W. Millar & Company, Inc., $39.86 and $37.75; and M. S. Ginn & Company, $38.20 less 2 per cent.

For 10,000 pounds of 70 lb. kraft paper: Whitaker Paper Company, 7.8 cents per pound; Cauthorne Paper Company, 8.04 cents; Mathers-Lamm Paper Company, 7.65 cents; W. L. Jones, Inc., 6.86 cents; J. W. Butler Paper Company, 10.25 cents; Walker Goulard Plehn Company, Inc., 8 cents; Reese & Reese, Inc., 8.2 cents; and United Supply Company, 7 cents.

For 3,000 pounds of 180 lb., kraft paper: Whitaker Paper Company, at 7.3 cents per pound; Cauthorne Paper Company, 6.34 cents; Mathers-Lamm Paper Company, 6.55 cents; W. L. Jones, Inc., 6.37 cents; J. W. Butler Paper Company, 8.5 cents; Walker Goulard Plehn Company, Inc., 6.9 cents less 2 per cent; Reese & Reese, Inc., 7.57 cents; and United Supply Company, 6 cents less 2⅛ per cent.

For 500 pounds of stereo tissue paper: Cauthorne Paper Company, 71 cents per pound; Russell Products Company, 83 cents and 79 cents.

For 175 sheets of cloth lined manila paper: Barton, Duer & Koch Paper Company, $45.00 per C sheets; Mathers-Lamm Paper Company, $43.98; R. P. Andrews Paper Company, $48.00; Whitaker Paper Company, $40.00 and $37.50; Walker Goulard Plehn Company, $43.00 less 2 per cent; and Reese & Reese, Inc., $39.50 and 36.75.

The Mathers-Lamm Paper Company will furnish 36,000 pounds (225,000 sheets) of 34x44, No. 40 white sulphite bond paper at 6.06 cents per pound bids for which were received on June 24.

The R. P. Andrews Paper Company will furnish 5,525 pounds (25,000 sheets) of 25½x30½, buff sulphite paper at 6.79 cents per pound and Reese & Reese, Inc., will furnish 36,000 pounds of 24x36 rope manila paper at 10 cents per pound. Bids for both of these items were received on June 21.

Weakness in French Paper Market

French paper manufacturers report that the outlook seems to be for continued weakness in the market owing to over-supply by the domestic mills. Production during the second quarter will probably be well below capacity with attendant unemployment. Some specialties are in a better position than the trade in general. For instance, cigarette paper production continues in good volume with few idle machines. An effort on the part of 75 paper manufacturers in France to reach a production agreement is reported to have failed, as a similar attempt on the part of the kraft manufacturers failed earlier in the year. Meanwhile, the last mill of Les Papeteries de l'Ouest closed in December, and it is rumored that another large mill in western France is about to close down. While recent depreciation of foreign currencies (Belgian, Swedish and Norwegian) raises the possibility of increased foreign competition, the domestic market is protected by quotas. No construction is under way, nor projected. The only changes consist of rearrangements and machinery installations in existing plants.

Indianapolis Demand Unsettled

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., July 8, 1935—The paper demand in this territory is somewhat unsettled, particularly in the fine paper field. Jobbers are inclined to blame the weather which just turned summer, there being no spring season at all. Much work in the printing establishments was abandoned altogether by the large direct by mail merchandisers because of unseasonal weather.

Other items in the paper list seem to be moving well. There is some demand for covers and the common paper list is selling in a satisfactory manner. Local jobbers of common papers say the demand is rather better than they had expected at this season. Department and other stores are good buyers and quite a lot of merchandise is being sold to industrials. Cleaning establishments are ready buyers of bags.

Local manufacturers of boxes and containers say the demand is just fair. Box demand has slumped somewhat from the late winter demand due to a lessened demand from the automobile accessory manufacturers. Other buyers, however, are in the market and in another month the automobile accessory factories also are expected to resume buying. Manufacturers of hardware are taking some stock. Most of the local concern is being felt concerning the Wagner labor bill which has just been signed by the President. Some of the local executives feel there may be some plant difficulties, particularly about hours. Experienced box makers in this territory are none too plentiful and any shortening of hours especially in peak seasons would work a hardship on the companies.

Tissues are moving nicely, according to local jobbers and the last two weeks have seen a big increase in demand for all building papers. Summer specialties are having a steady sale, following the initial rush a couple of weeks ago. Extremely hot weather and the holiday last week depleted stocks in retail hands and Friday and Saturday saw a good volume of business.

The waste paper market is reported a trifle weak. Mill demand is none too good, but prices are being well held. Most of the demand appears to be for better grades of paper and rags.

I. C. C. Finds for Mead Corp.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 10, 1935—In the case of the Mead Corporation against the Akron, Canton & Youngstown Railway Company, the Interstate Commerce Commission has found that rates on printing paper (other than newsprint) in carloads, from Kingsport, Tenn., to points in the New England states, New York, New Jersey, Delaware, Maryland, Virginia, Pennsylvania, West Virginia, Ohio, Indiana, Michigan, Illinois, Wisconsin, Iowa, and the District of Columbia unreasonable for the future but not for the past. Reasonable rates have been prescribed for the future.

Finland To Expand Pulp Production

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 10, 1935—A program of expansion in Finnish wood pulp mills contemplates the addition of 76,000 to 78,000 metric tons (metric ton—2,205 pounds) to the sulphite output, 200,000 tons to the sulphate, and 23,100 tons to the mechanical groundwood, according to a report from Consul General Herbert S. Goold, Helsingfors. The present productive capacity of the Finnish wood pulp mills is 1,876,700 metric tons, divided as follows: Sulphite pulp 969,000 tons, sulphate pulp 278,000 tons, and groundwood 629,700 tons.

Philadelphia Paper Market Dull

PHILADELPHIA, Pa., July 8, 1935—The first week of July experienced a quietus in the activities of both divisions of the paper trade—fine and coarse—a moiety of which is, of course, due to the holiday which intervened. The fine paper branch of the business is seasonably quiet, but therein lies the opportunity of the waste paper dealers which has, so long, been looked forward to, for, with a very heavily increased demand on the part of the mills, and at best a meager supply of stock due, in a great measure, to the market being pretty well cleaned up of its surplus stock, it is conceded by those in the waste paper industry that higher prices are in the offing. Prices in the lower grades have improved slightly, this improvement having been brought about by reason of the fact that collections from stores, printers and other producers have fallen off approximately 40 per cent. compared with last December —the prices being so unattractive that no one will gather it unless where it is absolutely necessary, and now that accumulation is reduced, better prices are expected to follow.

The Penn Paper and Stock Company has acquired what is known as the Lear property approximating 200,000 square feet at the north end of Cramps Shipyard, which will be used for storage purposes. The acquisition of this property affords facilities for loading merchandise on to boats. Their Philadelphia and Baltimore plants are working to capacity, and their Washington plant has enough work booked ahead for another year. Operation in mills is reported to be a whole lot better.

For the most part the paper houses are adopting the Saturday closing schedule for the summer; those that are keeping open are working with a skeleton force.

The headquarters of the Philadelphia Paper Trade Association are now located in Room 355 Drexel Building, Fifth and Chestnut streets.

Hammermill Agents To Meet Aug. 22-23

The Twenty-fourth Annual Conference of Hammermill Agents will be held in Erie on August 22 and 23, announcement was made this week by Hammermill Paper Company. Plans are for business sessions in the mornings of both days, followed by golf and other recreational activities in the afternoon.

The general meetings will be preceded by a meeting of the Hammermill Advisory Committee on the afternoon of Wednesday, the 21st.

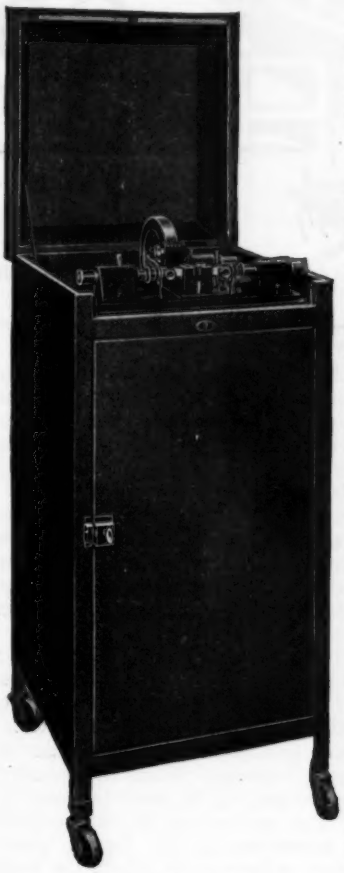
The Hammermill conventions have now been continuous for nearly a quarter of a century without a break for any reason. Owners and managers of wholesale paper houses from border to border and from coast to coast attend these meetings, and many of the representatives have not missed any of the meetings for more than twenty years. In this year's sessions the Hammermill organization will deal intensively with very active merchandising plans adapted to the fall and winter months and running into 1936.

New Ross Vapor Absorption Bulletin

A new bulletin has just been completed by the J. O. Ross Engineering Corporation of 350 Madison avenue, New York City, which fully describes and illustrates the modern Ross-Grewin Vapor Absorption System, of which there are now more than 150 installations in operation.

The Ross-Grewin High Pressure System not only materially reduces the pressure in the driers but it likewise assures even drying across the sheet, increases life of felts, eliminates wet streaks and economizes on steam consumption. A copy of this bulletin will be gladly furnished any interested executive without obligation.

New Folding Endurance Tester



The cohesive properties of paper, irrespective of tensile, bursting strength, etc., are determined by a new and improved Folding Endurance Tester manufactured by the Amthor Testing Instrument Company of Brooklyn, N. Y. The machine is constructed to standard specifications and is said to have shown excellent results in comparative tests. It is motor driven for harmonic action. The mechanism and motor are housed in a steel cabinet for protection against dust, rust, and damage when not in use.

Operation is simple. The specimen is held under standard tension by two jaws of the floating type which are kept in perfect horizontal alignment by frictionless supports. A reciprocating blade double folds the paper until it breaks. The number of folds is progressively registered on a four figure counter which provides easy and errorless readings. When the specimen breaks, the counter is instantly disengaged and the motor stopped. A descriptive circular may be obtained by writing the Amthor Testing Instrument Company, Inc., 10 Leo Place, Brooklyn, N. Y.

Wm. B. Shuler Gives Y. W. C. A. Camp

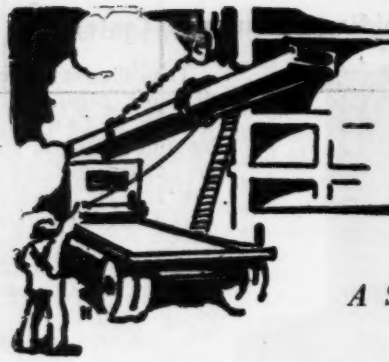
DAYTON, Ohio, June 28—The Young Women's Christian Association of Hamilton is to have a country home—a farm of 53 acres, more or less, just north of Summerville, the gift of William B. Shuler, of the firm of Shuler & Benninghofen, woolen and felt manufacturers.

The farm is located along seven mile creek just north of Summerville, and contains not only a large stretch of level ground that can be devoted to various activities, but also a large grove of oak trees while the creek itself cuts across the southern section of the land.

Details for the camp, its equipment and arrangement, will not be worked out, however, until the return of Miss Mary Gall, general secretary of the Y. W. C. A., who is now on a vacation trip in Europe.

It is planned, however, to so arrange the farm that it will be an ideal spot especially for girls, every feature of the camp contributing to their comfort, their convenience and their enjoyment.

The gift of Mr. Shuler is greatly appreciated by members of the Y. W. C. A., who see in it an opportunity for a great enlargement of the constructive work that is being done on behalf of the girls of Hamilton.



CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Kalamazoo, Mich.—The High Speed Box Company, recently organized to manufacture paper boxes and containers, folding cartons, etc., has taken over space in Remington Building and will occupy for local plant. Extensive production facilities will be developed. George J. Bachmeyer and Smith Hoover head new organization.

Peshtigo, Wis.—The Badger Paper Mills, Inc., has approved plans for improvements in boiler house and equipment, and will proceed with work at once. General contract has been let to the C. R. Meyer & Sons Company, 50 State street, Oshkosh, Wis. No estimate of cost has been announced.

Natural Dam, N. Y.—Wyoming Valley Paper Mill, 5 Beekman street, New York, N. Y., manufacturer of tissue and light grade papers, is said to be arranging for early operations at former mill of the Oswegatchie Paper Company, Natural Dam, recently acquired for new plant as lately referred to in these columns. Plant of purchasing company at Northumberland, N. H., was damaged by fire a few months ago and production at the Natural Dam mill will replace operations at the former plant. Improvements will be made in latter mill, which has been idle for some time past. It is expected to give employment to about 150 persons in different departments.

Philadelphia, Pa.—Fire recently damaged a portion of plant of the Container Manufacturing Company, Nixon street and Schuylkill River, manufacturer of paper boxes and containers. An official estimate of loss has not been announced. The damage will be replaced.

Port Huron, Mich.—The Port Huron Sulphite and Paper Company, manufacturer of writing papers, tissue and other paper stocks, is now giving employment to 325 workers in different departments, with high production schedule. It is proposed to hold to present operating basis for an indefinite period.

Savannah, Ga.—The Union Bag and Paper Corporation, Woolworth Building, New York, N. Y., has made application for company charter under Georgia laws, with capital of $1,500,000, to provide for operation of proposed new pulp and paper mill, and paper converting plant at Hermitage Plantation, near Savannah, soon to be erected, as previously announced in these columns. The new mill will cost approximately $4,000,000, including machinery.

Shelton, Wash.—The Rainier Pulp and Paper Company, 343 Sansome street, San Francisco, Cal., will soon proceed with superstructure for new building at mill at Shelton, comprising a one-story unit, 46 x 180 feet, to be used primarily for storage and distribution purposes. It will cost approximately $25,000, with equipment. Bids were recently closed on general contract.

Battle Creek, Mich.—The Michigan Carton Company, manufacturer of paper and paperboard stocks for container production, is considering early increase in working force for higher production schedule. Plant is now running on basis closely approximating that of a year ago at this time.

Jackson, Miss.—The United States Corrugated Fibre Box Company, 1400 Roosevelt avenue, Indianapolis, Ind., manufacturer of corrugated fiber boxes and containers, will soon break ground for proposed new branch plant near Jackson, where site has been secured on opposite side of river in Rankin County, as recently noted in these columns. It will be one-story, 150 x 400 feet, estimated to cost approximately $50,000, with equipment. New mill is expected to be ready for service early in the fall. H. J. Lacy is president.

Camden, Ark.—Fire recently damaged a portion of local mill of the Southern Kraft Corporation, manufacturer of kraft paper stocks. An official estimate of loss has not been announced. The damage will be replaced.

Monroe, La.—The Bancroft Bag Factory, West Monroe, manufacturer of paper bags and containers, has superstructure under way on new one-story plant addition, 80 x 200 feet, and will have unit ready for equipment installation at early date. It is estimated to cost approximately $75,000, with equipment. Herbert Dickard, Monroe, is consulting engineer, in charge.

Skutskar, Sweden—Stora Kopparbergs, A.B., manufacturer of cellulose sulphite products, has plans under way for new addition to local mill, designed to double present rated capacity of 25,000 tons per annum. Work will comprise several new buildings and installation of machinery, and will be placed under way at an early date. Cost over $350,000, with equipment.

Hobart, Tasmania—The Tasmanian Paper Printing Company, Ltd., Hobart, will take bids at once for construction of proposed new pulp and paper mill, recently referred to in these columns, and will place orders for machinery and equipment closely following. New plant will consist of several large producing units and is estimated to cost approximately $1,000,000, including machinery.

Prague, Czechoslovakia—The Ossig Chemical Union, Ltd., Prague, is arranging for expansion at main plant, to develop a new division for the manufacture of photographic papers and kindred processed paper stocks. New buildings are scheduled for early erection. Equipment installation will provide for large output. A department will also be established for the production of photographic films and allied specialties. Entire project is reported to cost over $200,000, with equipment.

Liverpool, England—The Gee Manufacturing Company, Signal Works road, Walton, Liverpool, has work nearing completion on a new mill, location noted, to be given over to the manufacture of metallized paper con-

tainers for oils, grease and kindred products. This is an entirely new industry for the country, the company having secured the rights for manufacture from European interests. Equipment installation will provide for large output, with employment of about 200 persons for initial operations. It is proposed to have the plant ready for production at early date. It will represent an investment of more than $100,000, including machinery.

New Companies, Etc.

New York, N. Y.—The Safeway Products Corporation has been chartered with capital of 200 shares of stock, no par value, to manufacture and deal in paper goods of various kinds. Avery Stirratt, 9 West Stanton avenue, Baldwin, L. I., is principal incorporator and head. Company is represented by John W. Matz, 49 Wall street, New York.

Milwaukee, Wis.—The Butler Paper Company has been organized to deal in paper products of various kinds. New company is headed by Frank R. Pierce, 3536 North Frederick avenue, and Leland Stuht, 208 North 47th street, both Milwaukee.

New York, N. Y.—The Swiss Foil Corporation has been chartered with capital of 200 shares of stock, no par value, to manufacture metallic foils and kindred paper specialties. The incorporators include E. N. Goodwin and William L. Glenn, 44 Wall street, New York.

New York, N. Y.—The Admiral Envelope Company, Inc., has been organized with a capital of $20,000, to manufacture and deal in commercial envelopes and kindred paper specialties. New company is represented by Benjamin Hart, 55 West Forty-second street, New York.

Newark, N. J.—The Durham Paper Board Company, Inc., has been incorporated with capital of 1800 shares of stock, no par value, to manufacture and deal in paper and paperboard products. New company is represented by Nicholas R. Fiore, 790 Broad street, Newark.

Long Island City, N. Y.—The Hinsdale Paper Stock, Inc., has been chartered with capital of $5000, to deal in paper goods of various kinds. The incorporators include Frank Dorr, 182 Watkins avenue, Brooklyn, N. Y., and Pasquale Esposito, 6921 Seventy-eighth street, Queens, N. Y.

Ward Howard Visits Coast

Ward R. Howard, vice-president of the Howard Paper Company and of the Maxwell Paper Company, recently visited San Francisco and Los Angeles and in the course of a trip that included also a visit to the Hawaiian Islands. He was accompanied by Mrs. Howard. Mr. Howard also attended the annual meeting of the Pacific Coast Paper Trades Conference at Del Monte.

During his visit to the Islands, Mr. Howard appointed the American Factors, Ltd., agent for Howard Bond and Maxwell Offset and for Maxwell Bond. The American Factors, Ltd., is a very large concern with branches in Hilo and other points in the Islands.

Mr. Howard is very optimistic about the general situation in the paper business and the industries which it serves. He looks for a slow but steady and substantial improvement and states that throughout the country there is a steadily increasing demand for all paper products.

Speaking of the code, Mr. Howard said that the feeling throughout the entire paper industry is that the systems built up on the code will be preserved. He looks for stabilization rather than demoralization and for a generally improved situation.

The Howard and Maxwell mills are running at capacity and steadily increasing their market. Both these houses have been steady and aggressive advertisers for years and Mr. Howard states that the policy on advertising will be more comprehensive and active in the future than in the past. He was much pleased with the increasing distribution of Howard and Maxwell printing papers on the Coast, the sales having grown to a remarkable volume from a very small beginning.

During his stay on the Coast, Mr. Howard was in contact with the Blake, Moffitt & Towne houses, which are the agents for his company's products. After leaving San Francisco on his return from Honolulu, Mr. Howard returned to St. Louis via Portland and Seattle.

British Market for Toilet Tissues

With the newsprint market in the hands of well-organized buyers and rendered extremely competitive by home and overseas suppliers, and with the kraft paper market limited by agreement, it would seem that the less affected sulphite paper market offers certain attractions which have not perhaps been sufficiently appreciated by Canadian mills, writes G. A. Newman, Assistant Canadian Trade Commissioner in London.

Users of the finer qualities of sulphite paper are almost completely dependent upon supplies from Norway and Sweden. Domestic mills have so far not been able to manufacture to such requirements, and, in spite of the import duty of 16 2/3 per cent, large quantities of this type of paper continue to be shipped from Scandinavian countries. M. G. pure sulphite paper finds its main outlets in the manufacture of toilet rolls, bags, and wrappings. Of these, the toilet-roll market would likely prove the most attractive.

The question naturally arises as to whether it would be better to supply the finished roll for direct sale to the public, or in reels to the British roll manufacturers. While it is true that, before the imposition of the duty, toilet paper in rolls and in the flat was being extensively imported from Scandinavia, the trade has now fallen away and remains largely in the hands of some eight or nine well-known United Kingdom manufacturers. It is likely, says Mr. Newman, that Canadian shippers would find it in their best interest to concentrate attention on the manufacture of paper for the use of the English roll manufacturers. In the first place, paper sent over in reels would be cheaper in freight costs and, in the second place, the competition would be limited to exporters from Norway and Sweden, while if efforts were made to introduce the finished roll, there would be all the keen opposition of the English manufacturers with their established brands.

Market for Transparent Cellulose in Brazil

WASHINGTON, D. C., July 10, 1935—The market in Brazil for transparent cellulose sheeting for wrapping cigarettes, candy, toilet articles, haberdashery, and other products is fairly good, according to a recent report from Consul General Samuel T. Lee, Rio de Janeiro. Present suppliers are Germany, France and the United Kingdom, with some competition from the United States. Japanese firms are attempting to enter this market but their prices are not as low as had been anticipated, and the great distance and consequent delays are restricting business. Prices of the American product are reported to be slightly higher than those of the European, but such business as is obtained is secured on the basis of quality. Domestic manufacture of competitive wrappings is limited to glassine paper, which does not possess the same properties as transparent sheeting. Little decorated transparent sheeting is sold here now but it is not impossible that its use in connection with gift packages may be extended.

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FOREIGN PAPER TRADE

Exports of paper and paper products from the United States during April do not show much change compared with either the preceding month or with the corresponding month last year according to the Forest Products Division of the Department of Commerce. Compared with March there was a decrease in total value of 9 percent, nearly all items contributed to this decline, with the heaviest losses occurring in exports of newsprint, over-issue news, and fiber insulating board. Shipments of book, cover, writing paper, boxboard, and Bristol board, offset to some extent decreases in other lines. Compared with April, 1934, however, a somewhat better showing was made, total shipments having increased 7 percent in value. Boxboard shipments were more than double in volume, writing paper shipments increased 99 percent, fiber insulating board 70 percent and other boards 50 percent. Considerable advances were also registered in shipments of book paper, paper bags, and paper boxes and cartons, while smaller gains occurred in shipments of tissue, toilet paper, and paper towels, blotting, sheathing paper and cash register and adding machine rolls. Total exports of paper and paper products during April were valued at $1,692,976.

Exports of paper base stocks from the United States dropped off sharply in April compared with the preceding month, although they still exceeded those for the corresponding month last year by 35 percent. Exports consist principally of sulphite wood pulp, April shipments of this item amounting to 11,518 tons valued at $654,583. The remaining shipments comprised 5,132 cords of pulpwood, 201 tons of other wood pulp, and 3,217 tons of rags, all valued at $144,191.

Imports of paper and paper products during April were slightly in excess of the March receipts but failed to quite reach the level of April, 1934. Imports of standard newsprint were about 3 percent under those of a year ago but exceeded March receipts by 4 percent. Imports of other paper and board show a rise of 16 percent in aggregate value compared with a year ago, but were 5 percent under March receipts. Increases occurred principally in kraft wrapping and pulpboard in rolls. Receipts of cigarette paper, usually ranking second to newsprint in value, declined 10 percent compared with March but were 4 percent over those recorded for April, 1934. Total imports of paper and paper products during April were valued at $7,333,474, comprising 188,700 tons of standard newsprint valued at $6,475,839 and $857,635 worth of other paper and board.

Imports of paper base stocks decreased sharply during April compared with March, although exceeding April, 1934 receipts by 7 percent. Imports of bleached sulphite were larger than during either of the other months; imports of unbleached sulphite were about on a level with a year ago, but dropped off nearly 50 percent compared with March; receipts of kraft pulp were nearly 15 percent higher than a year ago but also show a sharp decline compared with the preceding month. Imports of rags and other waste for paper stock were higher than in the preceding month, and rag imports also exceeded those of April 1934. Imports of all classes of paper base stocks during April reached an aggregate value of $3,997,509 divided as follows: pulpwood $187,817, woodpulp $3,534,208 and rags and other waste $275,484. Imports during March reached an aggregate value of $5,083,788 and during April 1934 of $3,729,736.

CHEMICAL SHOW WILL EMPHASIZE THE LEADING POSITION OF AMERICA

A recent study of world production of chemical products strikingly indicates the leading position of American chemical industries. The United States produces more than one-third the world output of sulphuric acid. It produces more chlorine than all the rest of the world combined. It has several alkali plants whose monthly production is greater than that of all Italy. The same supremacy is held by petroleum products, metal products, cement, synthetic textiles, rubber, artificial leather, and many others.

Through the recent panic years companies have put up with makeshifts and have hopefully repaired obsolete machinery to cut down immediate costs. The situation was somewhat akin to that of a pioneer putting up a lean-to as a shelter from the immediate storm. After the sky cleared, if he intended to live in the same location, his natural instinct was to replace the lean-to with a house of strong foundation capable of weathering many storms, rather than to consider constantly repairing the makeshift. Now the sky of business conditions has begun to clear, and the time has come to replace the old "lean-to" machinery with new equipment which will give the producer a firm foundation for eventual increased production. The chemical industry, although old in its basic unit operations is always new in its application of equipment for increasing the quality and quantity of output and reducing its cost.

Up to date production methods are an insurance policy

for company sales and business security. The numerous processes recently developed for making products that could not formerly be produced economically, require new machines. Through the more calm consideration which has come with increasing confidence in means available, producers know that their greatest savings will be realized, not by skimping through continued use of obsolete repaired machinery, but through the installation of equipment—time saving, efficient, and up to date.

World wide demand for equipment for the manufacture of chemicals and allied products is present and immediate. America holds the leading position among chemical industries. International interest is naturally directed toward the leader. The problem then is to put in harmonious and reciprocal relationship—the supply and the demand. There must be a common meeting ground for producer and consumer.

The 15th Exposition of Chemical Industries will take place in December 2-7—in New York—when the demand is immediate, and in the United States—where the interest is centered. Here the supply and the demand will be efficiently coordinated.

For Paper Industry in Australia

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 10, 1935—An expenditure of £1,000,000 in establishing a paper industry in Australia is contemplated within the next two years, according to a recent report from Trade Commissioner E. C. Squire, Sydney. Press announcements state that the new projects contemplate the manufacture of fine printing and writing papers and pulp, utilizing the Australian eucalyptus as a raw material. Amalgamated Zinc (De Bavays) Ltd., through the Tasmanian Paper Proprietory Ltd., and Australian Paper and Pulp, through Australian Paper Manufacturers Ltd., are very largely interested in this enterprise. The third party is a group (formerly non-newspaper members of Paper Makers Ltd.) who have rights to property and timber interests at and near Burnie, Tasmania. The whole of the capital required will be subscribed privately. It is considered probable, however, that both Amalgamated Zinc and Australian Paper will themselves make public issues of debentures or shares later in order to provide the necessary capital for financing the project. Three sites are under consideration as the location of the mill, namely, at Eden, New South Wales; Kermandie, Southern Tasmania; and Burnie, North-western Tasmania. The manufacture of newsprint paper is not contemplated in the present plans.

Acquires Sherman Paper Products Corp.

Gair Boston Containers, Inc., has acquired the Corrugated Container Division of Sherman Paper Products Corporation, it was announced yesterday from the General Offices in New York. The Medford Plant and Container Sales Office of Gair Boston Containers, Inc., of which Gordon W. Olson is vice-president and manager, will move to Newton Upper Falls, where the Sherman plant is located.

The Sherman Paper Products Corporation will concentrate on their line of paper specialties including pan liners, corrugated, glassine and parchment for the food and other industries in adjacent buildings now part of their property.

Weekly Production Ratio Report

Reports to the American Paper and Pulp Association show the following Over-All Production Ratios for the designated periods.

	Reporting Mills		Total Production
	Number	Capacity	Ratio
September, 1934	292–299	.....	59.4%
October, 1934	297-394	.....	64.7%
November, 1934	385-399	.....	61.7%
December, 1934 (a)	396-404	.....	62.1%
January, 1935	397–411	.....	65.8%
February, 1935	407–409	.....	70.0%
March, 1935	406–408	.....	70.5%
April, 1935	405–407	.....	70.0%
May, 1935	375–407	.....	69.4%
*Week ending June 8, 1935	373	150,868	70.5%
*Week ending June 15, 1935	366	147.479	71.0%
*Week ending June 22, 1935	350	144,764	73.0%
*Week ending June 29, 1935	290	116,638	71.1%

Statistics showing the number of mills reporting by ratio groups are given below:

	Number of Mills Reporting			
	Week ending			
Ratio Limits	June 8, 1935	June 15, 1935	June 22, 1935	June 29, 1935
0% to 50%	124	119	108	82
51% to 100%	249	247	242	208

* Subject to revision.

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours" were as follows:

	September, 1934	62 per cent
	October, 1934	63 per cent
	November, 1934	56 per cent
(a)	December, 1934	53 per cent
	January, 1935	61 per cent
	February, 1935	67 per cent
	March, 1935	67 per cent
	April, 1935	61 per cent
	May, 4, 1935	61 per cent
	May, 11,1935	61 per cent
	May 18, 1935	59 per cent
	May 25, 1935	61 per cent
	June 1, 1935	57 per cent
	June 8, 1935	61 per cent
	June 15, 1935	65 per cent
	June 22, 1935	65 per cent
	June 29, 1935	69 per cent

(a) Capacity and percentage data exclude December 25, 1934.

Revised statistics covering delinquent mill returns will be shown in later reports.

Union Bag Incorporates in Georgia

A petition for the incorporation of a company to be known as the Union Bag and Paper Corporation of Georgia has been filed in the Georgia Superior Court by a Savannah law firm. The formation of a Georgia corporation has been contemplated in the plans of the Union Bag and Paper Corporation of New Jersey, which operates plants at Hudson Falls and Fenimore, since they decided to establish a $4,000,000 plant in Savannah. The principal place of business of the new corporation will be in Savannah.

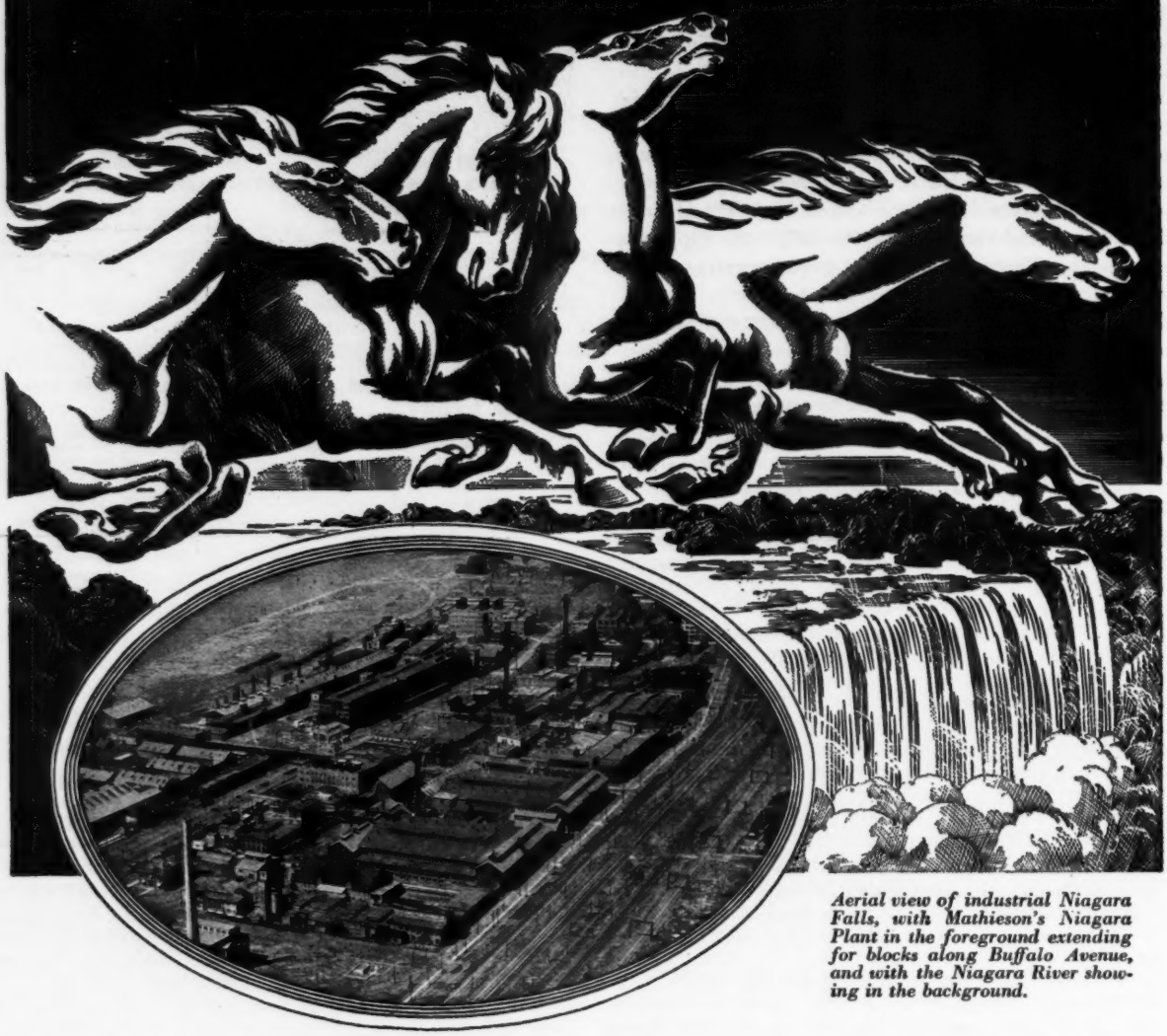
"The amount of capital to be employed is $1,500,000 and the corporation shall have the power to create and issue for cash, property, or services 15,000 shares of stock of the par value of $100 each, all of one class," says the petition. Each such share shall have one vote. No part of the capital has been actually paid in, but the corporation is not to begin to use its powers until all of its capital stock has been subscribed and 10 per cent of it paid in.

Large Registration at Maine

The University of Maine Summer Session of six weeks, in Pulp and Paper Technology, opened July 1 with the largest registration for a number of years.

Extensive repairs and enlargements have been made in the basement of Aubert Hall, giving more room for present equipment and larger space for new equipment in this department.

Where Niagara's "Wild Horses" are harnessed into MATHIESON SERVICE



Aerial view of industrial Niagara Falls, with Mathieson's Niagara Plant in the foreground extending for blocks along Buffalo Avenue, and with the Niagara River showing in the background.

POWER, the all-important factor in so many manufacturing processes, brought Mathieson to Niagara nearly forty years ago. It was here that Mathieson established the first unit in America for the electrolytic production of caustic soda and chlorine products.

Today, after almost two-score years of steady expansion, Mathieson's chief "raw material" continues to be the abundant hydro-electric power of Niagara. From the raging torrents of this world-famous waterfall Mathieson draws the thousands of horsepower needed in the production of Mathieson Liquid Chlorine, Niagara Caustic Soda, Bleaching Powder, Ammonia and HTH Products.

To the "wild horses" of Niagara are harnessed abundant and nearby sources of raw materials, up-to-date manufacturing facilities, trained plant personnel, ample container equipment, excellent transportation facilities and experienced traffic counsel. The result is Mathieson service, prompt, smooth-running, dependable.

Mathieson Chemicals

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Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

Pulp and Paper Industry Literature Review

Abstracts of Articles and Patents Compiled by the Abstracts and Bibliography Committee of the Technical Association of the Pulp and Paper Industry, A. Papineau-Couture, John F. Ohlson, C. E. Peterson and Clarence J. West, Chairman

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C., for 10 cents each. Send currency, not stamps.

Paper Specialties

Carbon Papers. Morland and Impey, Ltd., and Arthur G. Rendall. Brit. pat. 404,801 (Jan. 25, 1934).—A carbon sheet has a carbon coating on both sides and one coating is covered by a layer of wax or the like which on being compressed by a typewriter, etc., becomes transparent and allows the carbon layer to show clearly, thereby enabling the sheet to serve as one of the copies. To promote adhesion of the wax, etc., layer the carbon surface may be treated with a binding agent, *e.g.*, a solution of ester gum in di-butyl phthalate containing alumina in suspension.—A.P.-C.

Carbon-Paper Coating Compositions. Rinco A.-C. Brit. pat. 405,858 (Feb. 15, 1934).—A fundamental color which does not combine with the support and which is free from fats or waxes is applied to the support and to the fundamental layer is applied a second layer. Thus, the first layer may contain an aqueous solution of casein, Turkey-red oil, glycerol, lampblack and Prussian blue and the second, stearic esters of glycol, water and titanium dioxide.—A.P.-C.

Carbon Paper. Deutsche Hydrierwerke A.-C. Fr. pat. 757,735 (Dec. 30, 1933).—Saturated or unsaturated mono- or polyhydric aliphatic alcohols of high molecular weight, or naphthenic alcohols are used as solvents or emulsifiers in making coloring pastes for carbon papers. —A.P.-C.

Copying Papers Société Anonyme des Anciens Establissements Braunstein Frères. Brit. pat. 403,002 (Dec. 14, 1933).—Paper is impregnated with a fatty substance before applying the ink, or the fatty substance, *e.g.*, stearic acid, is added to the paper pulp. A soluble stearate may be used and decomposed by oxalic acid.—A.P.-C.

Waterproof Paper. International Bitumen Emulsions Corp. Brit. pat. 403,116 (Dec. 8, 1933).—Water-impermeable papers and pasteboards containing 50 to 60% of asphalt distributed in finely divided form are prepared by pretreating the fibrous pulp in the beater with solutions of resin soaps, oleates of alkali metals, alkali gels or alkali salts of Turkey-red oils, thereupon adding the requisite amount of asphalt as an aqueous emulsion and then working up the material on the paper machine. If desired, a precipitant may be added, prior to the working up, to cause the asphalt to be precipitated in finely divided form through the mass, sodium chloride, sodium sulphate, sodium bisulphate, aluminum sulphate and alum being specified.—A.P.-C.

Method and Apparatus for Making Shingle Elements. Frederick C. Overbury assignor to The Patent and Licensing Corp. U. S. pat. 1,970,431 (Aug. 14, 1934).—Individual shingles or shingle strips, immediately after being severed from a sheet of impregnated and coated roofing felt, are fed between a pair of cam rolls which apply a coating of bitumen to the butt end and over the freshly cut surfaces of the shingles or strips.—A.P.-C.

Paper Making Process. Harold L. Levin assignor to The Patent and Licensing Corp. U. S. pat. 1,970,426 (Aug. 14, 1934).—A mixture of substantially dry fibrous material, (containing not over 10 percent. moisture) and of solid fusible binder (*e.g.*, asphalt, rosin, pitch, etc.) is disintegrated in a hammer mill, preferably with the addition of a small quantity of materials such as sodium silicate, clay or soap solution to the mass in the mill in order to prevent blocking of the screen through which the disintegrated material is withdrawn from the mill. The material is molded or formed into sheets, either dry or from aqueous solution.—A.P.-C.

Manufacture of Water-Repellent Papers of High Wet Strength. George A. Richter and Milton O. Schur assignors to Brown Co. U. S. pat. 1,971,274 (Aug. 21, 1934).—Waterleaf paper is treated with viscose so as to retain about 0.5 to 2 percent. in the finished paper, regenerating the cellulose from the viscose in situ in the paper, treating the latter with glue, drying, and depositing a substantially continuous coating of wax (preferably paraffin, to fill the residual pores in the paper.—A.P.-C.

Method of Making Composite Paper. Jere C. Mosher. U. S. pat. 1,969,938 (Aug. 14, 1934).—Moist creped paper on leaving the creping roll is brought into contact with a web of tough, smooth-surfaced paper, or is enclosed between two such webs, and the combined webs are pressed and passed around a large drying drum.—A.P.-C.

The Factors Involved In the Accuracy of Fiber Analysis*

By John H. Graff[1]

Abstract

This is presented as the first paper in a series relating to fiber analysis. In it there are described satisfactory methods for preparing slides and for counting fibers. Using this technique, the author has gone with some detail into the accuracy to be expected from a single analysis, and has made a practical application in determining the uniformity of a fiber furnish across the machine direction of a sheet of paper.

Because of the large variety of paper fibers in use at the present time and the increased demand for more accurate analyses of fiber compositions in paper, the following investigations were undertaken, having for their objective the development of these points:

I. A standard method for the preparation of slides.
II. A uniform count method.
III. The accuracy to be expected from a single analysis.
IV. The uniformity of a fiber furnish across the machine direction of a sheet of paper.

I. A Standard Method for the Preparation of Slides

With R. W. K. Ulm[2] and T. A. Howells[3]

The method of preparing the slides as used for the count method is a modification of one described by C. G. Bright. *(1)* The method is as follows:

Weigh out approximately 0.5 grams of the dry sample, tear into small pieces and put into a 30-cc. beaker, cover with 1 per cent NaOH and bring to a boil on a hot plate. Decant the alkaline solution, wash twice with distilled water, and cover with N/20 HCl. Allow to stand several minutes, decant the acid, and wash several times with water. Drain off the water and roll the pieces of paper into small pellets between the fingers and put into a 500-cc. Erlenmeyer flask. Add 250 cc. of distilled water and shake vigorously until the fibers are thoroughly disintegrated. Pour back and forth from a 250-cc. graduate several times, finally measuring out 125 cc. and discarding the remainder. Dilute this volume to 250 cc. shake and mix well as before. Again pour off 125 cc. of the mixture and dilute to 250 cc. This gives a suspension of consistency of 0.05 per cent.

Slides are kept in 50 per cent alcohol containing 0.5 per cent HCl.

After drying and polishing the slide, draw a line on it one inch from each end with a soft lead pencil. The pencil line will keep the fiber suspension inside the given area. Remove dust, lint, and graphite particles from the slide with a small camel's hair brush, and place the slide on a hot plate at 50 to 60 deg. C.

The hot plate must be absolutely level, must have a mat black top surface, and have a temperature control.

Place the slide on the hot plate and carefully run 0.5 cc. of suspension onto each end of the slide from a pipette made from 5 mm. inside diameter glass tubing. Evaporate a portion of the water, then carefully tap the suspension with a dissecting needle to distribute the fibers evenly inside the one inch square area on the end of each slide. Let the slides stand on the hot plate until completely dried.

Fig. 1 shows a slide prepared by this method. This consistency should give about 250 fibers to a count for each slide. Since different fibers vary considerably, however, it is preferable to prepare standards of different furnishes of appoximately the consistency desired. Suspensions may then more rapidly be made to match standards corresponding to papers being analyzed, without weighing and measuring exactly. Care should be taken that the suspension is kept well mixed while samples are being withdrawn. By this method, one man can prepare from fifty to eighty slides a day, depending upon the number of slides required from each sample.

II. The Method of Counting

As the fibers on each end of the slides prepared above cover one square inch, it is advisable to use cover glasses of that width. Put two to three drops of the stain on the fiber, cover with cover glass in such a manner as to prevent the formation of air bubbles, let stand for one minute, then drain on a piece of blotting paper and place the slide on the microscope.

The fiber field is now focused at a point about one or two millimeters from the upper or furthest edge of the cover glass. The stage is then gradually moved so that the slide goes from the left to the right or vice versa, and each kind of fiber is counted as it passes the center of the cross hair or the end of the pointer in the eye piece.

If a fiber crosses the center of the cross hair more than once, it is counted each time, but if the major part of the fiber moves parallel with the end under the center for some time, it is only counted once. In fiber bundles or clumps of ground wood, every fiber in the bundle, as it passes under the center is counted. Very fine fragments are ignored, but larger fragments are kept in mind so that when two or three of the same kind come in the same line of the field they can be added together as one.

After all the fibers of each kind have been counted in one line, the stage is moved 5 mm. back and a new line is counted in the same manner. Again the stage is moved 5 mm. back, and this change in field is made until the fibers in five separate fields across the slide, each 5 mm. apart, have been counted. See Fig. 2.

If a fiber composition contains two types of fibers which are difficult to differentiate, it is well while moving the slide in one direction to count the one most readily distinguished. When the slide is moved in the reverse direction, every fiber of both kinds is counted. The number of fibers of the second kind is obtained by subtracting the first value from the second.

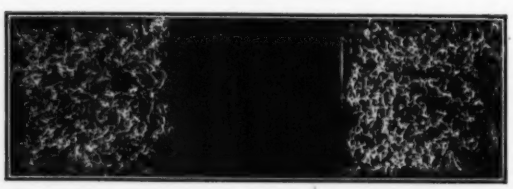


FIG. 1
Slide prepared by the method outlined.

* Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 18 to 21, 1935.
[1] Research Associate, The Institute of Paper Chemistry, Appleton, Wis.
[2] Student at Institute of Paper Chemistry.
[3] Student at Institute of Paper Chemistry.

If a larger number of analyses have to be made, it is time saving and adds to the accuracy to use a tally counter in the left hand to count one kind of fiber, while a second kind is counted mentally, thereby counting two kinds of fibers each time the microscopic field is brought across the stage.

When the number of each kind of fiber has been counted, this number is multiplied by its corresponding weight factor and the percentage calculated.

The weight factors which have been used, and which have proved to give very good compensation for the different types of fibers, not only by the Institute, but also by experienced fiber technologists employed at different mills are as follows:

Rag	1.000
Chemical coniferous fibers	0.809
Chemical deciduous and bast fibers	0.550
Ground wood fibers	1.325

III. The Accuracy of Analysis

To determine the accuracy of this count method, four different paper samples were selected. Two were unbleached sulphite-ground wood mixtures, a third contained unbleached and bleached sulphite and soda, and a fourth contained bleached sulphite, Cellate, rag and hard wood sulphite.

Five slides of each sample were prepared by this standard method, a fiber count analysis was made of both ends of each slide, and the average of the ten separate fiber calculations of each sample was taken as the true fiber composition of each sample.

The slides were numbered from 1 to 5 and the different ends of each slide designated as "a" and "b".

The results have been outlined as shown in Tables I to IV, and the standard deviations and probable errors calculated by the equation:

$$\text{Standard Deviation (S.D.)} = \sqrt{\Sigma \frac{\delta^2}{N}} \qquad (1)$$

$$\text{Probable Error (P.E.)} = 0.6745\sqrt{\Sigma \frac{\delta^2}{N-1}} \qquad (2)$$

where δ is the deviation and N the number of analyses.

Example I—Unbleached softwood sulphite—ground wood mixture.

The data in Table I for the first mixture show that the average of the ten calculations prove the fiber content of the sheet to consist of 51 per cent softwood unbleached sulphite and 49 per cent ground wood.

For each single field the standard deviation was 2.54 per cent and the probable error 1.81 per cent, while if two fields were used, the standard deviation was 1.00 per cent and the probable error 0.76 per cent. The curves for *Example I* (Fig. 3) show that in 42 per cent of the number of calculations the per cent error falls between 0 and 1 per cent, using one field of the slide, while with both fields 83 per cent of the calculations have a probable error of between 0 and 1 per cent.

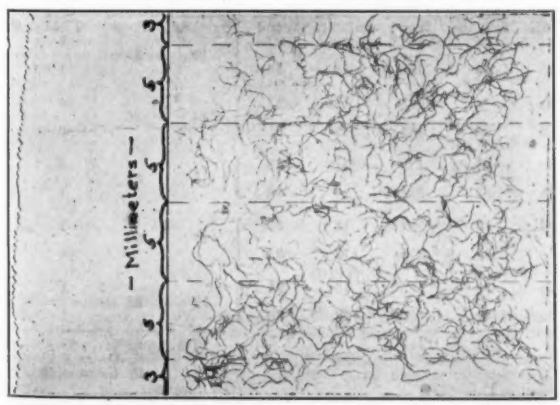


FIG. 2

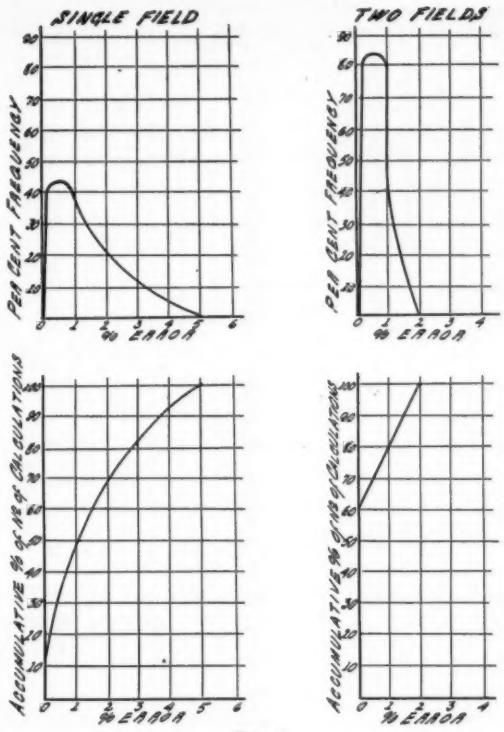


FIG. 3

Distribution of per cent error of the total average of Example I.

The curves also show that in 80 per cent of the number of calculations the per cent error is less than 3 per cent for one field and for two fields all the calculations have less than 2 per cent error.

Example II—Unbleached softwood sulphite — ground wood mixture.

In Example II, which consisted of 15 per cent softwood unbleached sulphite and 85 per cent ground wood, the standard deviation was 1.95 per cent and the probable error 1.39 per cent, using a single field, and for two fields the standard deviation was 1.27 per cent and the probable error 1.22 per cent. The curve charts show that the largest number of errors lie between 0 and 1 per cent, using one field, and between 1 and 2 per cent for two fields. The charts also show that all the calculations had less than 3 per cent error using one and less than 2 per cent error using two fields. (Fig. 4).

Example III—Bleached and unbleached softwood sulphite and hardwood soda mixtures.

Example III consisted of ten per cent softwood unbleached sulphite, 57 per cent softwood bleached sulphite, and 33 per cent hardwood soda with respective standard deviations of 1.48, 3.16 and 3.26 per cent and probable errors of 1.06, 2.25, and 2.31 per cent, using one field, and standard deviations of 1.67, 2.05, and 2.32 per cent and probable errors of 1.27, 1.54 and 1.75 per cent for two fields. The curve charts (Fig. 5) for this example show that the larger number of errors fall between 0 and 2 per

TABLE I—EXAMPLE I

51 PER CENT S. W. UNBLEACHED SULPHITE AND 49 PER CENT GROUND WOOD

	Count		Per Cent by Weight: One Field		Per Cent by Weight: Two Fields		δ^2	
Slide	S. W. Unbleached Sulphite	Ground Wood	S. W. Unbleached Sulphite	Ground Wood	S. W. Unbleached Sulphite	Ground Wood	One Field	Two Fields
1a	149	82	52	48	51	49	1	0
1b	112	69	49	51			4	
2a	116	78	47	53	51	49	16	0
2b	154	78	54	46			9	
3a	110	63	49	51	52	48	4	1
3b	152	81	53	47			4	
4a	115	82	46	54	49	51	25	4
4b	92	53	51	49			0	
5a	133	74	52	48	51	49	1	0
5b	101	61	50	50			1	
	1234	721			51%	49%	65	5
							S. D. = 2.54	1.00
							P. E. = 1.81	0.76

Deviation One Field
0%-10%, 1%-30%, 2%-30%, 3%-10%, 4%-10%, and 5%-10% of number of calculations.
Deviation Two Fields
0%-60%, 1%-20%, and 2%-20% of number of calculations.

cent both for one and two fields and that for 60 per cent of the number of calculations all the errors were less than 3 per cent for one field, and using two fields, 80 per cent of the number of calculations had less than 3 per cent error for any one of the components.

Example IV—Bleached softwood sulphite, Cellate, hardwood sulphite and rag.

Example IV consisted of 6 per cent softwood bleached sulphite, 33 softwood Cellate, 49 rag and 12 hardwood sulphite with corresponding standard deviations of 1.67, 3.17, 3.31 and 2.47 per cent, and probable errors of 1.19, 2.25, 2.36, and 1.89 per cent using one field, and standard deviations of 1.48, 2.80, 2.05 and 1.95 per cent probable errors of 1.12, 2.10, 1.75 and 1.47 per cent for two fields. The curve charts for Example IV (Fig. 6) show that in 52 and 72 per cent of the number of calculations respectively the errors for softwood sulphite and Cellate are between 0 and 1 per cent for one field, while in 60 to 82 per cent of the calculations for two fields the same error range obtains.

The largest per cent errors both for rag and hardwood sulphite are between 1 and 3 per cent for one and two fields. In 70 per cent of the number of calculations all the errors are less than 3 per cent for one field and for two fields 80 per cent of the number of calculations are below 3 per cent error.

IV. The Uniformity of a Fiber Furnish Across the the Machine Direction of a Sheet of Paper

After demonstrating that by this count method the fiber analysis of a sample of paper containing up to four different components can be made with a probable error of less than 3.50 per cent using a single field, and with a probable error of less than 2.00 per cent when two fields are use, the next thing investigated was the uniformity of the fiber furnish across the machine direction of a paper.

To carry out this investigation, ten different papers were obtained varying in width from 70 to 142 inches across the machine. Three to five samples were taken at different points across the paper, three slides were prepared from each individual sample, and calculations were made of both ends of each slide, making six calculations for each sample.

The papers were of different kinds and were given the following identifications:

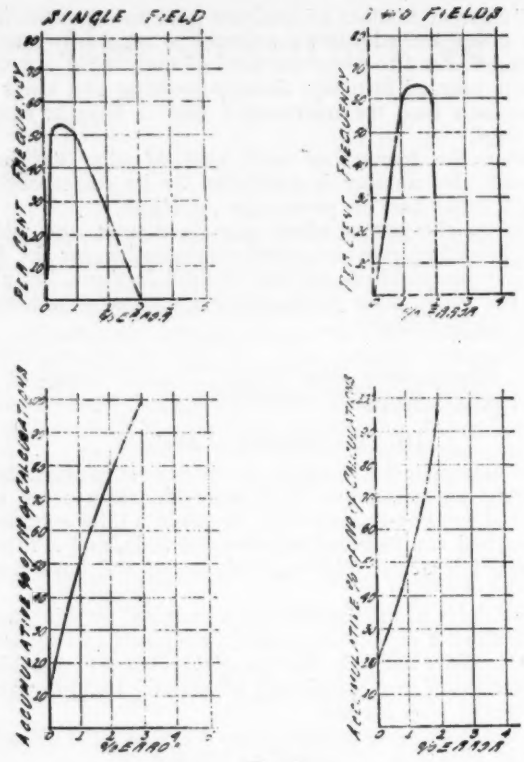


FIG. 4
Distribution of per cent error ot the total average of Example II.

Ia. Unbleached and bleached sulphite: M. G. waxing.
Ib. Unbleached and bleached sulphite: M. G. waxing.
II. Bleached sulphite and Cellate.
III. Bleached softwood sulphite, softwood Cellate, and rag: 25 per cent rag grade.
IV. Bleached softwood sulphite, softwood Cellate, and rag: 25 per cent rag grade.
V. Bleached softwood sulphite, softwood Cellate, and rag: 50 per cent rag grade.
VI. Bleached softwood sulphite, softwood Cellate, and rag: 50 per cent rag grade.
VII. Unbleached softwood sulphite, semi-bleached softwood kraft, and ground wood butchers' wrap.
VIII. Unbleached and bleached sulphite.
IX. Unbleached and bleached sulphite.
X. Bleached softwood sulphite and ground wood.

TABLE II—EXAMPLE II

15 PER CENT S. W. UNBLEACHED SULPHITE AND 85 PER CENT GROUND WOOD

	Count		Per Cent by Weight: One Field		Per Cent by Weight: Two Fields		δ^2	
Slide	S. W. Unbleached Sulphite	Ground Wood	S. W. Unbleached Sulphite	Ground Wood	S. W. Unbleached Sulphite	Ground Wood	One Field	Two Fields
1a	66	181	18	82	17	83	9	4
1b	64	208	16	84			1	
2a	53	226	13	87	14	86	4	1
2b	55	186	15	85			0	
3a	41	189	12	88	13	87	9	4
3b	60	213	14	86			1	
4a	70	191	18	82	17	83	9	4
4b	72	215	17	83			4	
5a	53	165	16	84	15	85	1	0
5b	48	168	14	86			1	
	582	1942			15%	85%	38	13
							S. D. = 1.95	1.27
							P. E. = 1.39	1.22

Deviation One Field
0%-10%, 1%-40%, 2%-20%, and 3%-30% of number of calculations.
Deviation Two Fields
0%-20%, 1%-20%, and 2%-60% of number of calculations.

The calculations were tabulated in the same way as for the first four samples, giving the counts and actual percentage of mixture for each end of the slides, and giving the combined count of two ends and the average of each sample. The standard deviation and probable error were calculated for each sample, as before, for the variations between each sample of the whole paper, and also for the sum total of all the calculations for the paper. The different per cent deviations by the per cent total number of calculations of each paper were also tabulated for both one and two fields, and curves were drawn of the distribution of per cent errors. All of this is shown in the accompanying tables and charts.

Ia. Unbleached and Bleached Sulphite: M.G. Waxing

The analysis of M. G. waxing, consisting of 43 per cent unbleached sulphite and 57 per cent bleached sulphite, show that the standard deviation between the individual calculations for each sample taken across the paper varies between 2.68 and 3.04 per cent for a single calculation and the probable error varies between 1.98 and 2.23 per cent. For two calculations the standard deviation is between 0.82 and 1.82 per cent and the probable error is between 0.68 and 1.43 per cent for each sample.

The standard deviation and probable error for the average between each sample is 1.34 and 1.01 per cent, and the standard deviation and probable error for the sum totals of all the calculations for the whole paper is 2.47 and 1.71 per cent.

These results show that there is a larger variation in the single and double calculations between the individual calculations of each sample than there is between the averages of the results for each sample taken across the machine direction of the paper. The curves (Fig. 7) show that in 70 per cent of the number of calculations for the whole paper, the probable error is less than 3 per cent for each single field and for two fields the probable error is less than 2 per cent in 80 per cent of the calculations.

Ib. Unbleached and Bleached Sulphite: M.G. Waxing

This paper was the same as Ia but taken a few hundred feet further back in the run, and the tabulations of the result shows that here also the standard deviation and probable error between each single calculation are larger than between the averages for each sample across the machine, and the curves (Fig. 8) show that here too the

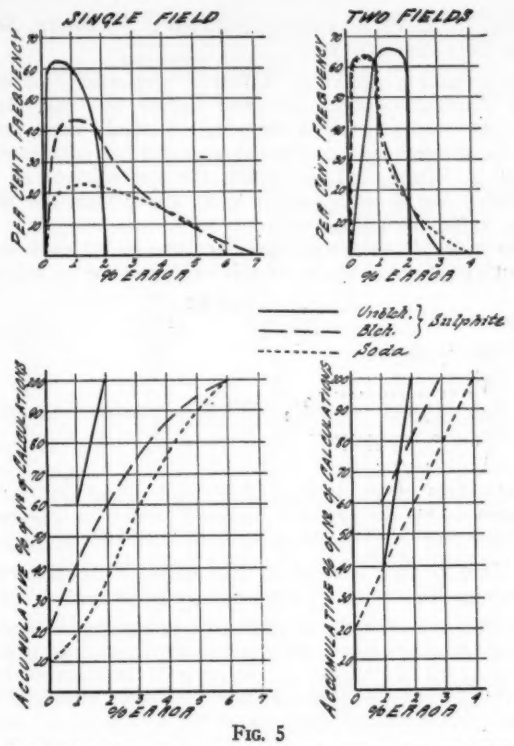


Fig. 5
Distribution of per cent error of the total average of Example III.

error is less than 3 per cent in 70 per cent of the number of calculations for a single field and less than 2 per cent for 80 per cent of the number of calculations when two fields are used.

II. Bleached Sulphite and Cellate

This paper consisted of 18 per cent softwood Cellate and 82 per cent softwood bleached sulphite, and as shown by the tables, here too the probable error between the separate calculations of each sample was larger than the probable error between the average for each sample. The curves (Fig. 9) show that in this case 80 per cent of the number of calculations had less than 3 per cent error when one field was used and less than 2 per cent error for two fields.

TABLE III—EXAMPLE III
10 PER CENT S. W. UNBLEACHED SULPHITE, 57 PER CENT S. W. BLEACHED SULPHITE, AND 35 PER CENT SODA

	Count			Per Cent by Weight						82					
				One Field			Two Fields			One Field			Two Fields		
Slides	S.W. Unbleached Sulphite	S.W. Bleached Sulphite	Soda	S.W. Unbleached Sulphite	S.W. Bleached Sulphite	Soda	S.W. Unbleached Sulphite	S.W. Bleached Sulphite	Soda	S.W. Unbleached Sulphite	S.W. Bleached Sulphite	Soda	S.W. Unbleached Sulphite	S.W. Bleached Sulphite	Soda
1a	19	110	104	9	55	36				1	4	9			
1b	15	100	101	8	54	38	9	54	37	4	9	25	1	9	16
2a	15	102	96	8	56	36				4	1	9			
2b	16	105	97	9	56	35	8	56	36	1	1	4	4	1	9
3a	20	96	93	11	53	36				1	16	9			
3b	26	115	85	11	50	39	12	56	32	1	49	36	4	1	1
4a	21	97	77	12	57	31				4	0	4			
4b	20	125	108	9	57	34	11	56	33	1	0	1	1	1	0
5a	15	116	94	8	59	33				4	4	0			
5b	19	127	90	9	61	30	8	60	32	1	16	9	4	9	1
	186	1093	945				10%	57%	33%	22	100	106	14	21	27

S. D. = 1.48, 3.16, 3.26, 1.67, 2.65, 2.32
P. E. = 1.06, 2.25, 2.31, 1.27, 1.54, 1.75

S. W. Unbleached Sulphite
Deviation one field: 1%-60%, and 2%-40% of number of calculations.
Deviation two fields: 1%-40%, and 2%-60% of number of calculations.
S. W. Bleached Sulphite
Deviation one field: 0%-20%, 1%-20%, 2%-20%, 3%-10%, 4%-20%, and 7%-10% of number of calculations.
Deviation two fields: 1%-60%, and 3%-40% of number of calculations.
Soda
Deviation one field: 0%-10%, 1%-10%, 2%-20%, 3%-40%, 5%-10%, and 6%-10% of number of calculations.
Deviation two fields: 0%-20%, 1%-40%, 3%-20%, and 4%-20% of number of calculations.

III, IV, V, & VI. Bleached Softwood Sulphite, Softwood Cellate and Rag

These papers contained different proportions of softwood bleached sulphite, softwood Cellate, and rag. Here again the errors between the single analysis were larger than the differences between the averages for each sample, except in Sample VI, in which the rag content of the middle of the sheet appeared to be lower than the sheet at the sides, as will be seen.

The probable errors of the calculations for each component of all the analyses of this sample were as follows:

	Sulphite Per cent	Cellate Per cent	Rag Per cent
SINGLE FIELDS			
III	2.73	2.16	1.97
IV	1.99	1.82	2.10
V	1.89	1.20	1.93
VI	1.84	2.28	2.80
TWO FIELDS			
III	1.67	1.15	1.28
IV	1.89	1.37	1.97
V	1.45	0.76	1.53
VI	1.54	1.93	2.78

The charts (Figs. 10, 11, 12 and 13) show that for all the components the per cent error was less than 3 per cent in 70 per cent of the total number of calculations.

VII Unbleached Softwood Sulphite, Semi-bleached Softwood Kraft and Groundwood Butcher's Wrap.

This paper contained 43 per cent unbleached softwood sulphite, 44 softwood semi-bleached kraft, and 13 ground wood. Again the errors of the single calculations were larger than between the average for each sample. The probable error for all the calculation was:

SINGLE FIELDS	
Unbleached Sulphite	1.51 per cent
Semi-bleached Kraft	1.80 per cent
Ground Wood	1.93 per cent
TWO FIELDS	
Unbleached Sulphite	0.96 per cent
Semi-bleached Kraft	1.22 per cent
Ground Wood	1.57 per cent

The curves for this sample (Fig. 14) show that in 80 per cent of the number of calculations the per cent error was less than 3 per cent for both one and two fields.

VIII and IX. Unbleached and Bleached Sulphites

These two papers, containing unbleached and bleached sulphite, also show that the probable error between the average for each sample is less than the probable error between single calculations of each sample and that the per cent errors of a single calculation is less than 2 per cent for single fields and less than 1.5 per cent for two fields in 80 per cent of the number of calculations. (Figs. 15 and 16.)

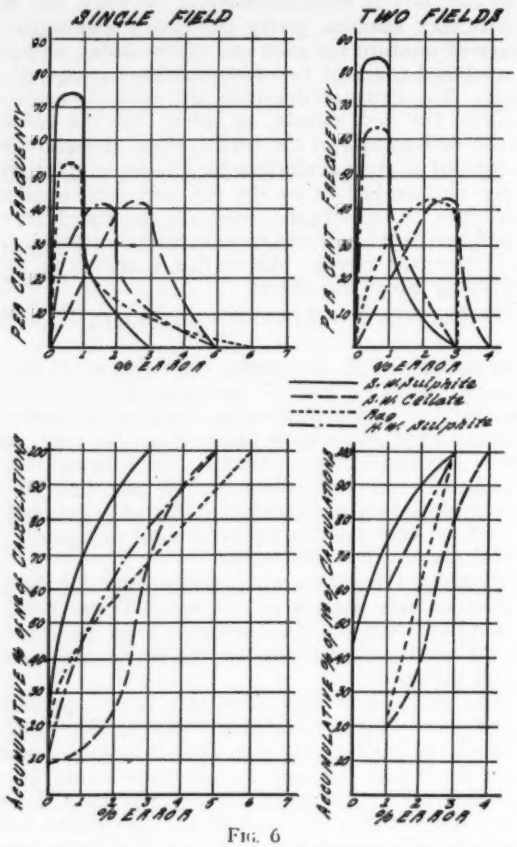


Fig. 6

Distribution of per cent error of the total average of Example IV.

X. Bleached Softwood Sulphite and Ground Wood

This paper contained 47 per cent softwood bleached sulphite and 53 per cent ground wood. The probable error between the average for each sample was less than the

TABLE IV—EXAMPLE IV

6 PER CENT S. W. BLEACHED SULPHITE, 33 PER CENT S. W. CELLATE, 49 PER CENT RAG, AND 12 PER CENT H. W. SODA

	Count				Per Cent by Weight								δ							
					One Field				Two Fields				One Field				Two Fields			
Slides	S.W. Bleached Sulphite	S.W. Cellate	Rag	H.W. Sulphite	S.W. Bleached Sulphite	S.W. Cellate	Rag	H.W. Sulphite	S.W. Bleached Sulphite	S.W. Cellate	Rag	H.W. Sulphite	S.W. Bleached Sulphite	S.W. Cellate	Rag	H.W. Sulphite	S.W. Bleached Sulphite	S.W. Cellate	Rag	H.W. Sulphite
1a	37	125	184	44	9	29	55	7	9	30	52	9	9	16	36	25	9	9	9	9
1b	25	84	105	49	9	31	48	12					9	4	1	0				
2a	14	82	116	64	5	29	51	15	5	32	48	15	1	16	4	9	1	1	1	9
2b	12	94	94	50	5	36	45	14					1	9	16	4				
3a	15	118	113	49	5	26	49	10	5	36	47	12	1	9	0	4	1	9	4	0
3b	16	98	112	56	6	33	48	13					0	0	1	1				
4a	20	148	147	51	5	38	48	9	6	37	46	11	1	25	1	9	0	16	9	1
4b	20	105	100	56	7	36	44	13					1	9	25	1				
5a	13	89	123	44	5	31	54	10	6	31	51	12	1	4	25	4	0	4	4	0
5b	26	94	119	63	8	30	48	14					4	9	1	4				
	198	1037	1213	526					6%	33%	49%	12%	28	101	110	61	11	39	27	19

S. D. = 1.67, 3.17, 3.31, 2.47, 1.48, 2.80, 2.05, 1.95
P. E. = 1.19, 2.25, 2.36, 1.89, 1.12, 2.10, 1.75, 1.47

S. W. Bleached Sulphite
Deviation one field: 0%-10%, 1%-60%, 2%-10%, and 3%-20% of number of calculations.
Deviation two fields: 0%-40%, 1%-40%, and 3%-20% of number of calculations.

S. W. Cellate
Deviation one field: 0%-10%, 2%-20%, 3%-40%, 4%-20%, and 5%-10% of number of calculations.
Deviation two fields: 1%-20%, 2%-20%, 3%-40%, and 4%-20% of number of calculations.

Rag
Deviation one field: 0%-10%, 1%-40%, 2%-10%, 4%-10%, 5%-20%, and 6%-10% of number of calculations.
Deviation two fields: 1%-20%, 2%-40%, and 3%-40% of number of calculations.

H. W. Sulphite
Deviation one field: 0%-10%, 1%-20%, 2%-40%, 3%-20%, and 5%-10% of number of calculations.
Deviation two fields: 0%-40%, 1%-20%, and 3%-40% of number of calculations.

TABLE V—Ia
UNBLEACHED AND BLEACHED SULPHITE: M. G. WAXING

Sample	Slide	Count: Unbleached Sulphite	Count: Bleached Sulphite	Per Cent by Weight Unbleached Sulphite: One Field	Per Cent by Weight Unbleached Sulphite: Two Fields
a1	1a	149	175	46	43
	1b	101	159	39	
	2a	168	204	45	46
	2b	142	164	46	
	3a	123	144	46	45
	3b	131	171	43	
		814	1017		45%
				S. D. = 2.68 — 1.29	
				P. E. = 1.98 — 1.07	
a2	1a	117	169	41	42
	1b	172	226	43	
	2a	197	228	46	43
	2b	103	166	38	
	3a	137	173	44	42
	3b	80	127	39	
		806	1089		43%
				S. D. = 3.04 — 0.82	
				P. E. = 2.23 — 0.68	
a3	1a	130	191	40	42
	1b	132	178	43	
	2a	159	183	47	46
	2b	95	121	44	
	3a	174	192	48	45
	3b	212	287	43	
		902	1152		44%
				S. D. = 2.68 — 1.73	
				P. E. = 1.98 — 1.43	
a4	1a	135	204	40	38
	1b	106	185	36	
	2a	175	276	39	41
	2b	169	221	43	
	3a	164	203	45	42
	3b	111	169	40	
		860	1258		41%
				S. D. = 2.91 — 1.82	
				P. E. = 2.15 — 1.51	
a5	1a	84	109	43	41
	1b	80	127	39	
	2a	130	165	44	43
	2b	112	153	42	
	3a	85	126	40	44
	3b	91	102	47	
		582	782		43%
				S. D. = 2.68 — 1.29	
				P. E. = 1.98 — 1.07	

SUMMARY OF Ia

		Count: Unbleached Sulphite	Count: Bleached Sulphite	Per Cent by Weight Unbleached Sulphite: One Field
a1	..	814	1017	45
a2	..	806	1089	43
a3	..	902	1152	44
a4	..	860	1258	41
a5	..	582	782	43
		3964	5298	43%
				S. D. = 1.34
				P. E. = 1.01

STANDARD DEVIATION AND PROBABLE ERROR FOR THE WHOLE WIDTH OF Ia

Single Fields
S. D. = 2.47 P. E. = 1.70
Deviations:
0%-20%, 1%-13%, 2%-10%, 3%-27%, 4%-20%, 5%-7%, 6%-0%, and 7%-3% of number of calculations.

Two Fields
S. D. = 2.06 P. E. = 1.44
Deviations:
0%-20%, 1%-33%, 2%-27%, 3%-13%, 4%-0%, and 5%-7% of number of calculations.

probable errors between the single calculations of the sample, and in 80 per cent of the number of calculations the per cent error was less than 3 per cent for a single field and less than 2 per cent for two fields. (Fig. 17).

The foregoing calculations show that there is a very

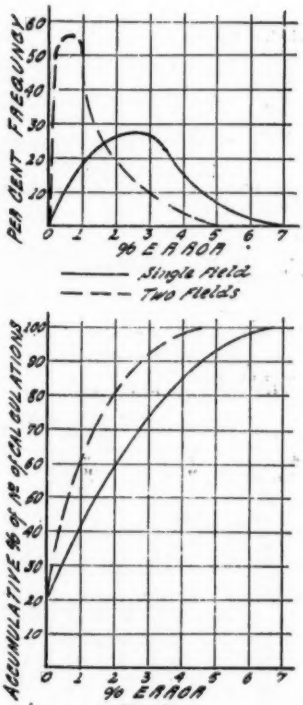


FIG. 7
Distribution of per cent error of the total average of Ia.

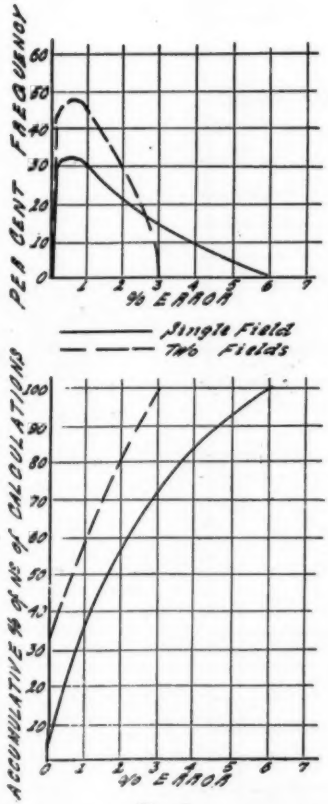


FIG. 8
Distribution of per cent error of the total average of Ib.

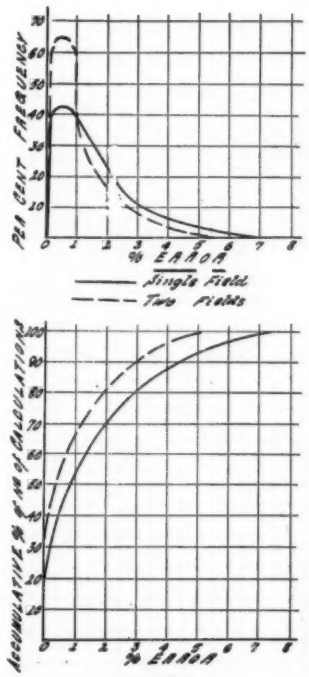


FIG. 9
Distribution of per cent error of the total average of II.

TABLE VI—Ib
UNBLEACHED AND BLEACHED SULPHITE: M. G. WAXING

Sample	Slide	Count: Unbleached Sulphite	Count: Bleached Sulphite	Per Cent by Weight Unbleached Sulphite: One Field	Two Fields	
b1	1a	101	152	40	42	
	1b	96	124	44		
	2a	115	140	45	43	
	2b	88	132	40		
	3a	113	177	39	43	
	3b	118	134	47		
		631	859			42%
				S. D. = 3.03	—	0.82
				P. E. = 2.24	—	0.68
b2	1a	150	189	44	45	
	1b	163	188	47		
	2a	160	189	46	43	
	2b	137	206	40		
	3a	159	224	42	40	
	3b	136	213	39		
		905	1209			43%
				S. D. = 2.94	—	2.08
				P. E. = 2.18	—	1.72
b3	1a	132	158	46	45	
	1b	144	176	45		
	2a	175	248	42	40	
	2b	181	281	39		
	3a	118	190	38	43	
	3b	160	187	46		
		910	1240			42%
				S. D. = 3.52	—	2.16
				P. E. = 2.45	—	1.78
b4	1a	159	212	43	42	
	1b	139	209	40		
	2a	208	268	44	43	
	2b	180	248	42		
	3a	168	214	44	45	
	3b	90	96	48		
		944	1247			43%
				S. D. = 2.49	—	1.29
				P. E. = 1.84	—	1.07
b5	1a	155	250	38	41	
	1b	183	237	44		
	2a	112	131	46	46	
	2b	104	126	45		
	3a	74	108	41	45	
	3b	128	136	49		
		756	988			44%
				S. D. = 3.53	—	2.16
				P. E. = 2.62	—	1.78

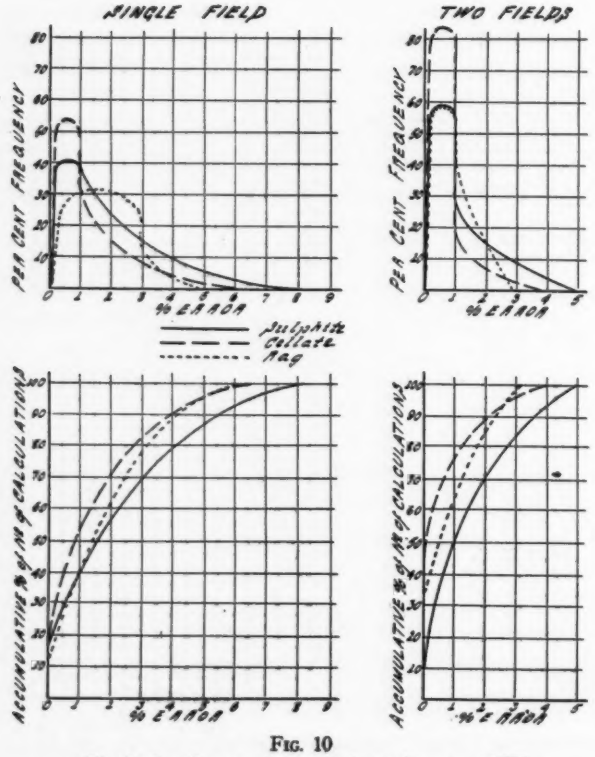


FIG. 10
Distribution of per cent error of the total average of III.

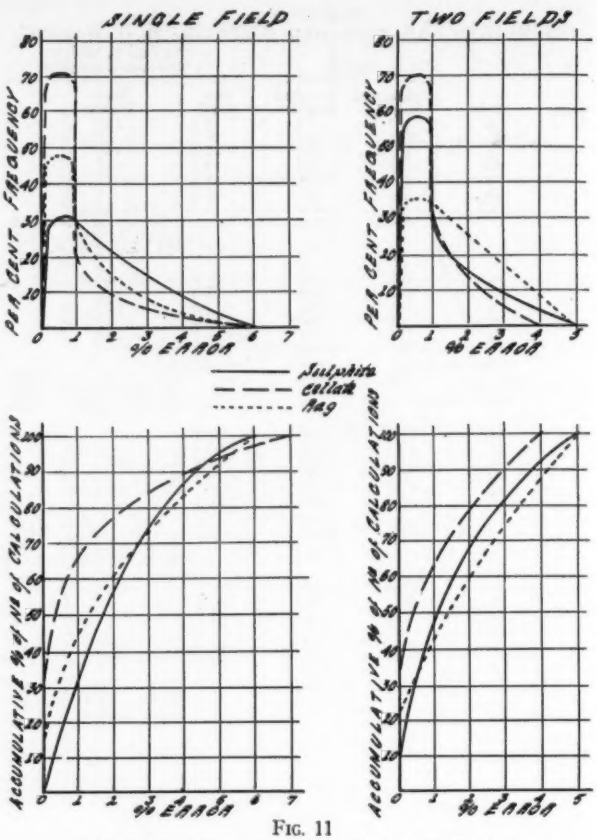


FIG. 11
Distribution of per cent error of the total average of IV.

SUMMARY OF Ib

b1	..	631	859	42
b2	..	905	1209	43
b3	..	910	1240	42
b4	..	944	1247	43
b5	..	756	988	44
		4146	5543	43%

S. D. = 0.78
P. E. = 0.58

STANDARD DEVIATION AND PROBABLE ERROR FOR THE WHOLE WIDTH OF Ib

Single Field
S. D. = 3.10 P. E = 2.12
Deviations:
0%-3%, 1%-27%, 2%-13%, 3%-27%, 4%-17%, 5%-10%, and 6%-3% of number of calculations.

Two Fields
S. D. 1.80 P. E. = 1.26
Deviations:
0%-33%, 1%-13%, 2%-33%, and 3%-21% of number of calculations.

TABLE VII
II. BLEACHED SULPHITE AND CELLATE

Sample	Slide	Count: Bleached Sulphite	Count: Bleached Cellate	Per Cent by Weight Cellate: One Field	Two Fields	
a1	1a	196	50	20	20	
	1b	101	25	20		
	2a	141	50	26	24	
	2b	125	32	20		
	1a	185	47	20	20	
	3b	123	28	19		
		871	232			21%
				S. D. = 2.34	—	1.92
				P. E. = 1.73	—	1.58
a2	1a	178	46	20	19	
	1b	100	19	16		
	2a	136	28	17	15	
	2b	127	18	13		
	3a	110	25	18	18	
	3b	132	29	18		
		783	165			17%
				S. D. = 2.16	—	1.73
				P. E. = 1.59	—	1.43

Sample	Slide	Count: Bleached Sulphite	Count: Bleached Cellate	Per Cent by Weight Cellate: One Field	Per Cent by Weight Cellate: Two Fields	
a3	1a	306	71	19	19	
	1b	178	39	18		
	2a	178	54	23	20	
	2b	228	53	19		
	3a	254	45	15	18	
	3b	217	55	21		
		1361	317			19%
						S. D. = 2.48 — 0.82
						P. E. = 1.83 — 0.68
a4	1a	196	36	16	15	
	1b	217	28	15		
	2a	196	31	14	17	
	2b	180	45	20		
	3a	227	56	20	18	
	3b	193	35	15		
		1209	241			17%
						S. D. = 2.45 — 1.29
						P. E. = 1.81 — 1.07
a5	1a	166	38	18	18	
	1b	165	36	18		
	2a	248	64	20	19	
	2b	255	56	18		
	3a	168	35	17	17	
	3b	205	42	17		
		1207	271			18%
						S. D. = 1.00 — 0.82
						P. E. = 0.74 — 0.68

SUMMARY OF II

a1	..	871	232	21
a2	..	783	165	17
a3	..	1361	317	19
a4	..	1209	241	17
a5	..	1207	271	18
		5431	1226	18%
				S. D. = 1.55
				P. E. = 1.17

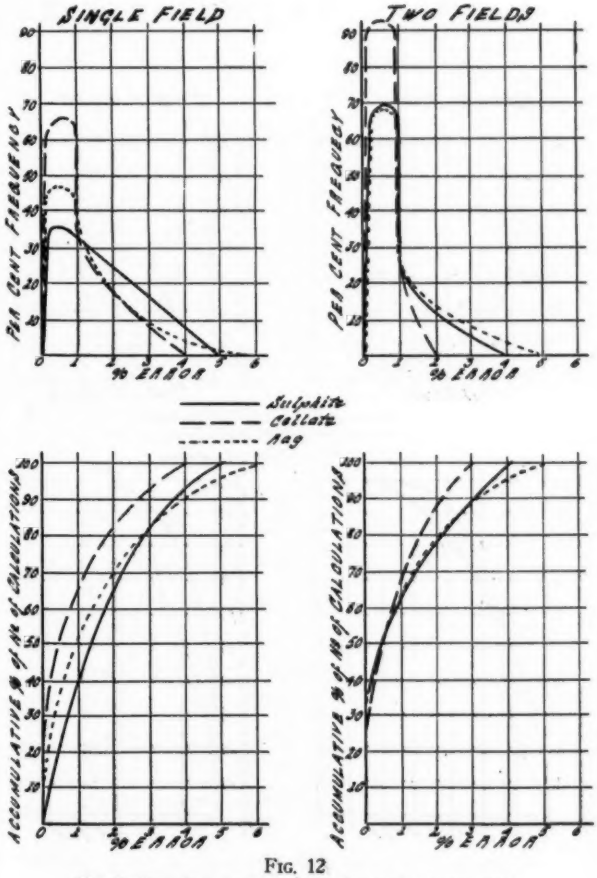


FIG. 12
Distribution of per cent error of the total average of V.

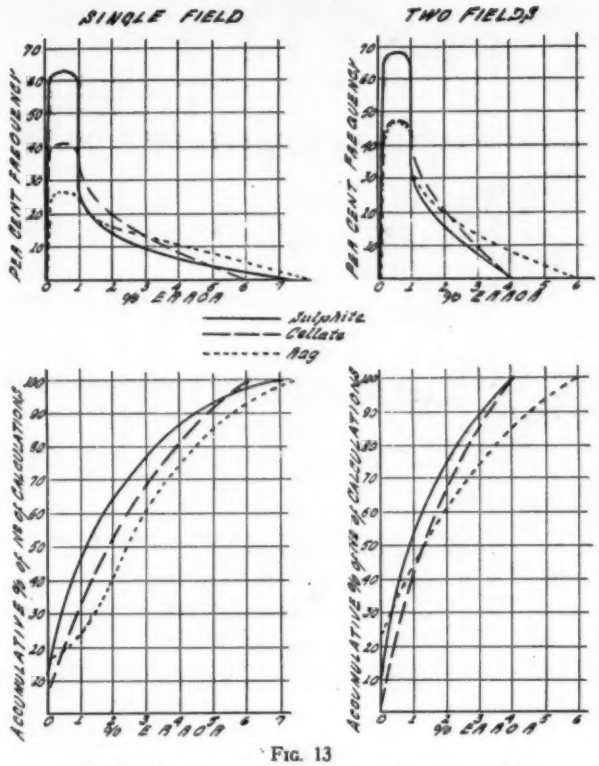


FIG. 13
Distribution of per cent error of the total average of VI.

STANDARD DEVIATION AND PROPABLE ERROR FOR THE WHOLE SAMPLE OF II

Single Field
S. D. = 2.56 P. E. = 1.75
Deviations:
0%-20%, 1%-20%, 2%-33%, 3%-13%, 4%-4%, 5%-7%, and 8%-3% of number of calculations.

Two Fields
S. D. = 2.18 P. E. = 1.51
Deviations:
0%-27%, 1%-33%, 2%-20%, 3%-13%, and 6%-7% of number of calculations.

TABLE VIII

III. BLEACHED SOFTWOOD SULPHITE, SOFTWOOD CELLATE, AND RAG: 25 PER CENT RAG GRADE

Sample	Slide	Count: Sulphite	Count: Cellate	Count: Rag	Per Cent by Weight: One Field: Sulphite	One Field: Cellate	One Field: Rag	Two Fields: Sulphite	Two Fields: Cellate	Two Fields: Rag
a1	1a	86	43	47	46	23	31			
	1b	62	40	36	42	27	31	44	25	31
	2a	111	69	74	41	25	34			
	2b	116	59	55	48	24	28	44	25	31
	3a	99	61	59	42	26	32			
	3b	97	52	60	43	23	34	42	26	32
		571	324	331				44%	25%	31%
								S. D. = 2.52—1.53—2.16—1.15—0.58—0.58		
								P. E. = 1.86—1.13—1.60—0.96—0.48—0.48		
a2	1a	88	51	54	43	25	32			
	1b	82	51	59	40	25	35	41	25	34
	2a	112	65	78	41	24	35			
	2b	73	34	31	50	23	27	44	24	32
	3a	92	68	67	38	28	34			
	3b	65	27	40	46	19	35	40	25	35
		512	296	329				42%	24%	34%
								S. D. = 4.13—2.72—3.06—1.73—0.82—1.29		
								P. E. = 3.04—2.00—2.26—1.43—0.68—1.07		
a3	1a	51	37	37	38	28	34			
	1b	55	36	40	39	26	35	39	26	35
	2a	46	35	23	42	32	26			
	2b	86	50	53	43	24	33	43	27	30
	3a	67	37	43	42	24	34			
	3b	70	24	30	53	18	29	47	21	32
		375	219	226				43%	25%	32%
								S. D. = 4.87—4.28—3.16—3.27—2.64—2.08		
								P. E. = 3.60—3.16—2.34—2.76—2.19—1.72		

SUMMARY OF III

a1	..	571	324	331	44	25	31
a2	..	512	296	329	42	24	34
a3	..	375	219	226	43	25	32
		1458	839	886			

43% 25% 32%

S. D. = 0.82—0.58—1.29
P. E. = 0.68—0.48—1.07

STANDARD DEVIATION AND PROBABLE ERROR FOR THE WHOLE FIELD OF III

Sulphite
Single Field
S. D. = 3.94 P. E. = 2.73
Deviations:
0%-17%, 1%-22%, 2%-11%, 3%-17%, 4%-6%, 5%-17%, 7%-6%, and 10%-4% of number of calculations.
Two Fields
S. D. = 2.34 P. E. = 1.67
Deviations:
0%-11%, 1%-45%, 2%-11%, 3%-11%, and 4%-22% of number of calculations.

Cellate
Single Field
S. D. = 3.12 P. E. = 2.16
Deviations:
0%-17%, 1%-33%, 2%-22%, 3%-11%, 6%-6%, and 7%-11% of number of calculations.
Two Fields
S. D. = 1.60 P. E. = 1.15
Deviations:
0%-45%, 1%-33%, 2%-11%, and 4%-11% of number of calculations.

Rag
Single Field
S. D. = 2.84 P. E. = 1.97
Deviations:
0%-11%, 1%-17%, 2%-28%, 3%-28%, 4%-6%, 5%-5%, and 6%-5% of number of calculations.
Two Fields
S. D. = 1.80 P. E. = 1.28
Deviations:
0%-34%, 1%-22%, 2%-22%, and 3%-22% of number of calculations.

TABLE IX

IV. BLEACHED SOFTWOOD SULPHITE, SOFTWOOD CELLATE, AND RAG: 25 PER CENT RAG GRADE

		Count			Per Cent by Weight: One Field			Two Fields	
Sample	Slide	Sulphite	Cellate	Rag	Sulphite	Cellate	Rag	Sulphite	Cellate	Rag
a1	1a	80	33	45	47	19	34	47	24	29
	1b	79	47	34	47	28	25			
	2a	72	45	57	38	24	38	41	22	37
	2b	112	54	74	43	21	36			
	3a	66	41	42	41	26	33	42	26	32
	3b	93	56	53	43	26	31			
		502	276	305				43%	24%	33%
					S. D. = 3.19—3.12—4.15—2.64—1.63—3.32					
					P. E. = 2.36—2.30—3.06—2.18—1.35—2.74					
a2	1a	104	56	55	45	25	30	45	26	29
	1b	119	74	60	45	27	28			
	2a	89	51	53	43	25	32	43	25	32
	2b	115	67	66	44	25	31			
	3a	81	52	54	40	26	34	41	25	34
	3b	122	74	82	41	25	34			
		630	374	370				43%	26%	31%
					S. D. = 1.91—0.91—2.20—1.63—0.82—2.16					
					P. E. = 1.42—0.68—1.63—1.35—0.68—1.79					
a3	1a	116	80	76	40	27	33	38	29	33
	1b	94	83	69	36	31	33			
	2a	141	88	75	44	27	29	45	27	28
	2b	123	72	60	45	27	28			
	3a	143	98	99	40	27	33	41	25	34
	3b	73	37	43	44	23	33			
		690	458	422				41%	27%	32%
					S. D. = 3.19—2.31—2.20—2.89—1.63—2.64					
					P. E. = 2.36—1.71—1.62—2.38—1.34—2.18					

SUMMARY OF IV

a1	..	502	276	305	43	24	33
a2	..	630	374	370	43	26	31
a3	..	690	458	422	41	27	32
		1822	1108	1097			

42% 26% 32%

S. D. = 1.00—1.29—0.82
P. E. = 0.83—1.07—0.68

STANDARD DEVIATION AND PROBABLE ERROR OF THE WHOLE FIELD OF IV

Sulphite
Single Field
S. D. = 2.86 P. E. = 1.99
Deviations:
1%-28%, 2%-33%, 3%-17%, 4%-6%, 5%-11%, and 6%-5% of number of calculations.
Two Fields
S. D. = 2.64 P. E. = 1.89
Deviations:
0%-11%, 1%-45%, 3%-22%, 4%-11%, and 5%-11% of number of calculations.

Cellate
Single Field
S. D. = 2.63 P. E. = 1.82
Deviations:
0%-17%, 1%-50%, 2%-11%, 3%-6%, 5%-11%, and 7%-5% of number of calculations.
Two Fields
S. D. = 1.92 P. E. = 1.37
Deviations:
0%-22%, 1%-45%, 2%-11%, 3%-11%, and 4%-11% of number of calculations.

Rag
Single Field
S. D. = 3.03 P. E. = 2.10
Deviations:
0%-6%, 1%-39%, 2%-22%, 3%-6%, 4%-17%, 6%-5% and 7%-5% of number of calculations.
Two Fields
S. D. = 2.76 P. E. = 1.97
Deviations:
0%-22%, 1%-12%, 2%-22%, 3%-22%, 4%-11%, and 5%-11% of number of calculations.

TABLE X

V. BLEACHED SOFTWOOD SULPHITE, SOFTWOOD CELLATE, AND RAG: 50 PER CENT RAG GRADE

		Count			Per Cent by Weight: One Field			Two Fields	
Sample	Slide	Sulphite	Cellate	Rag	Sulphite	Cellate	Rag	Sulphite	Cellate	Rag
a1	1a	99	44	121	33	15	52	35	14	51
	1b	137	55	159	35	14	51			
	2a	97	43	125	33	14	53	32	16	52
	2b	112	65	154	30	18	52			
	3a	124	55	161	33	14	53	33	15	52
	3b	66	34	75	34	17	49			
		635	296	795				33%	15%	52%
					S. D. = 1.53—1.63—1.42—1.29—0.82—0.58					
					P. E. = 1.13—1.21—1.04—1.07—0.68—0.48					
a2	1a	99	43	119	34	15	51	32	15	53
	1b	98	54	144	30	16	54			
	2a	84	42	117	31	15	54	33	15	52
	2b	119	48	132	36	14	50			
	3a	119	57	128	35	17	48	36	17	47
	3b	107	50	109	37	17	46			
		626	294	749				34%	16%	50%
					S. D. = 2.54—1.15—2.97—1.73—1.00—2.71					
					P. E. = 1.88—0.85—2.19—1.43—0.83—2.24					
a3	1a	66	47	96	29	20	51	29	16	55
	1b	89	40	144	29	13	58			
	2a	79	40	107	31	16	53	31	15	54
	2b	105	51	147	31	15	54			
	3a	85	52	129	29	17	54	32	17	51
	3b	88	39	92	37	15	48			
		512	269	715				31%	16%	53%
					S. D. = 2.82—2.16—3.06—1.29—0.82—1.73					
					P. E. = 2.09—1.59—2.26—1.07—0.68—1.43					

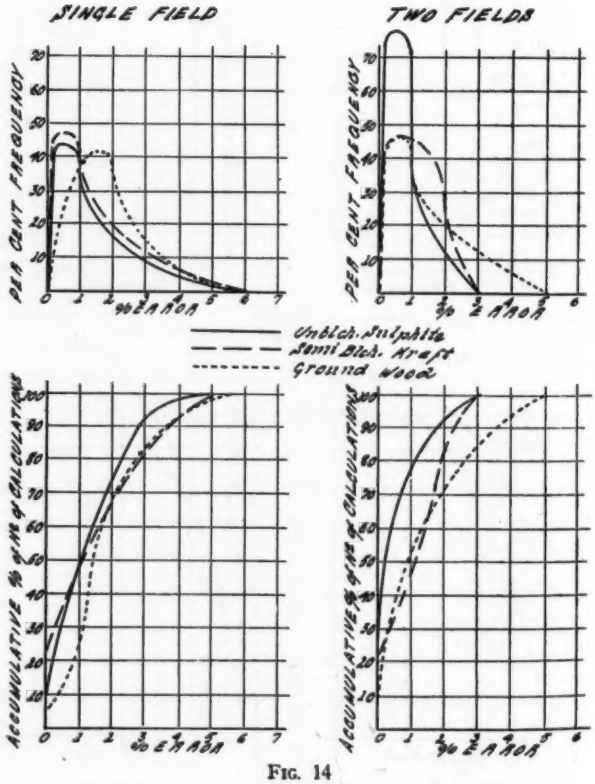


FIG. 14
Distribution of per cent error of the total average of VII.

SUMMARY OF V

a1	..	635	296	795	33	15	52
a2	..	626	294	749	34	16	50
a3	..	512	269	715	31	16	53
		1773	859	2259		32%	16% 52%

S. D. = 1.42—0.58—1.29
P. E. = 1.17—0.48—1.07

STANDARD DEVIATION AND PROBABLE ERROR FOR THE WHOLE FIELD OF V

Sulphite
Single Field
S. D. = 2.72 P. E. = 1.89
Deviations:
1%-33%, 2%-22%, 3%-28%, 4%-6%, and 5%-11% of number of calculations.
Two Fields
S. D. = 2.03 P. E. = 1.43
Deviations:
0%-33%, 1%-33%, 3%-22%, and 4%-12% of number of calculations.

Cellate
Single Field
S. D. = 1.73 P. E. = 1.20
Deviations:
0%-11%, 1%-50%, 2%-22%, 3%-11%, and 4%-6% of number of calculations.
Two Fields
S. D. = 1.05 P. E. = 0.76
Deviations:
0%-22%, 1%-66%, 2%-12% of number of calculations.

Rag
Single Field
S. D. = 2.78 P. E. = 1.93
Deviations:
0%-11%, 1%-33%, 2%-28%, 3%-6%, 4%-11%, and 6%-11% of number of calculations.
Two Fields
S. D. = 2.14 P. E. = 1.53
Deviations:
0%-33%, 1%-33%, 2%-12%, 3%-11% and 5%-11% of number of calculations.

TABLE XI

VI. BLEACHED SOFTWOOD SULPHITE, SOFTWOOD CELLATE, AND RAG: 50 PER CENT RAG GRADE

		Count			Per Cent by Weight: One Field			Per Cent by Weight: Two Fields		
Sample	Slide	Sulphite	Cellate	Rag	Sulphite	Cellate	Rag	Sulphite	Cellate	Rag
a1	1a	78	58	110	28	21	51	30	20	50
	1b	86	47	105	32	18	50			
	2a	78	57	106	29	21	50	30	20	50
	2b	102	67	136	30	20	50			
	3a	69	57	84	30	25	45	30	25	45
	3b	111	97	134	30	25	45			
		524	383	675				30%	22%	48%
					S. D. = 1.23—1.95—2.55—0.00—2.38—2.38					
					P. E. = 0.91—1.45—1.88—0.00—1.97—1.97					
a2	1a	55	59	67	28	30	42	28	27	45
	1b	80	73	109	28	25	47			
	2a	85	65	80	33	26	41	34	28	38
	2b	95	80	81	34	29	37			
	3a	113	88	116	33	25	42	35	25	40
	3b	100	59	78	39	23	38			
		526	424	531				33%	26%	41%
					S. D. = 3.80—2.45—3.24—3.16—1.42—2.94					
					P. E. = 2.81—1.81—2.40—2.61—1.16—2.42					
a3	1a	97	75	113	31	24	45	31	25	44
	1b	51	46	55	31	28	41			
	2a	71	53	84	31	23	46	29	25	46
	2b	65	63	85	28	27	45			
	3a	63	57	62	32	29	39	32	26	42
	3b	55	39	64	32	22	46			
		402	333	463				31%	25%	44%
					S. D. = 1.29—2.68—2.71—1.29—0.58—1.15					
					P. E. = 1.00—1.98—2.00—1.07—0.48—0.96					

SUMMARY OF VI

a1	..	524	383	675	30	22	48
a2	..	526	424	531	33	26	41
a3	..	402	333	463	31	25	44
		1452	1140	1669		31%	24% 45%

S. D. = 1.29—1.73—2.94
P. E. = 1.07—1.43—2.43

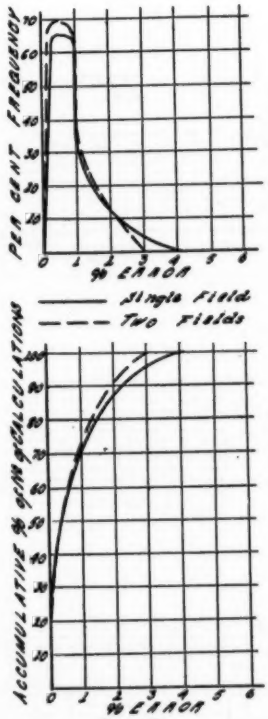


FIG. 15
Distribution of per cent error of the total average of VIII.

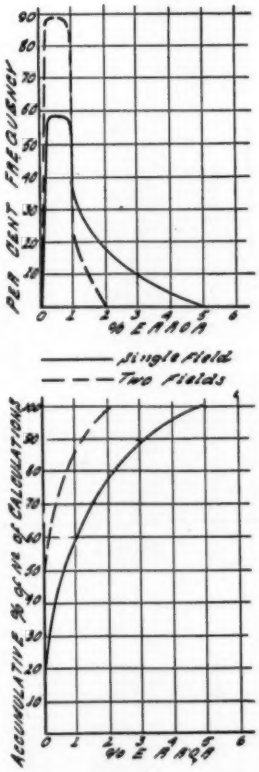


FIG. 16
Distribution of per cent error of the total average of IX.

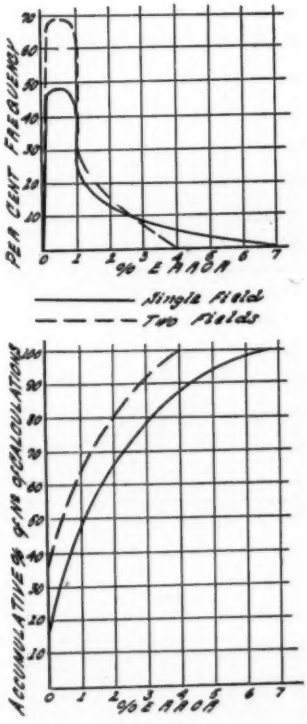


FIG. 17
Distribution of per cent error of the total average of X.

STANDARD DEVIATION AND PROBABLE ERROR FOR THE WHOLE FIELD OF VI

Sulphite

Single Field
S. D. = 2.65 P. E. = 1.84
Deviations:
0%-17%, 1%-33%, 2%-17%, 3%-28%, and 8%-5% of number of calculations.

Two Fields
S. D. = 2.16 P. E. = 1.54
Deviations:
0%-12%, 1%-44%, 2%-11%, 3%-22%, and 4%-11% of number of calculations.

Cellate

Single Field
S. D. = 3.28 P. E. = 2.28
Deviations:
0%-6%, 1%-33%, 2%-11%, 3%-17%, 4%-11%, 5%-11%, and 6%-11% of number of calculations.

Two Fields
S. D. = 2.69 P. E. = 1.93
Deviations:
1%-44%, 2%-12%, 3%-11%, and 4%-33% of number of calculations.

Rag

Single Field
S. D. = 4.02 P. E. = 2.80
Deviations:
0%-17%, 1%-6%, 2%-17%, 3%-17%, 4%-5%, 5%-22%, 6%-11%, and 8%-5% of number of calculations.

Two Fields
S. D. = 3.87 P. E. = 2.78
Deviations:
0%-22%, 1%-22%, 3%-12%, 4%-0%, 5%-33%, and 7%-11% of number of calculations.

TABLE XII

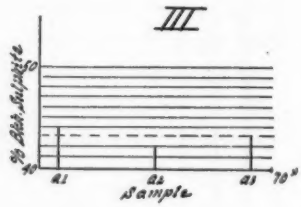
VII. UNBLEACHED SOFTWOOD SULPHITE, SEMI-BLEACHED SOFTWOOD KRAFT, AND GROUND WOOD BUTCHER'S WRAP

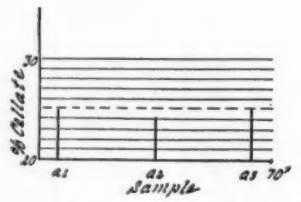
Sample	Slide	Count: Unblchd. Sulphite	Count: Semi-blchd. Kraft	Count: Ground Wood	Per Cent by Weight: One Field: Unblchd. Sulphite	One Field: Semi-blchd. Kraft	One Field: Ground Wood	Two Fields: Unblchd. Sulphite	Two Fields: Semi-blchd. Kraft	Two Fields: Ground Wood
a1	1a	129	127	32	42	41	17	43	43	14
	1b	154	161	24	44	45	11			
	2a	178	170	24	46	44	10	45	45	10
	2b	141	148	18	44	46	10			
	3a	174	161	30	45	42	13	44	45	11
	3b	124	138	17	43	47	10			
		900	905	145	44%	44%	12%			
					S. D. = 1.29—2.12—2.54—0.82—1.00—1.73					
					P. E. = 0.96—1.57—1.88—0.68—0.83—1.43					
a2	1a	74	84	15	40	46	14	42	45	13
	1b	106	107	19	43	44	13			
	2a	104	114	31	39	42	19	41	41	18
	2b	80	70	19	44	39	17			
	3a	107	115	10	45	48	7	43	48	9
	3b	100	118	16	41	48	11			
		571	608	110	42%	45%	13 %			
					S. D. = 2.16—3.28—3.94—0.82—2.89—3.70					
					P. E. = 1.59—2.42—2.90—0.68—2.38—3.06					
a3	1a	114	121	24	41	44	15	42	44	14
	1b	104	104	18	44	44	12			
	2a	90	101	14	42	47	11	44	46	10
	2b	121	118	15	46	44	10			
	3a	81	77	22	41	40	19	41	45	14
	3b	101	125	17	40	49	11			
		611	646	110	42%	45%	13%			
					S. D. = 2.08—2.83—3.32—1.29—0.82—1.92					
					P. E. = 1.54—2.09—2.44—1.07—0.68—1.58					
a4	1a	86	111	21	37	48	15	40	46	14
	1b	101	102	20	43	43	14			
	2a	103	90	19	46	40	14	44	42	14
	2b	85	86	18	42	43	15			
	3a	115	107	23	44	41	15	43	43	14
	3b	80	85	16	42	44	14			
		570	581	117	42%	43%	15%			
					S. D. = 2.76—2.58—0.71—1.73—1.82—1.00					
					P. E. = 2.04—1.90—0.52—1.43—1.51—0.83					
a5	1a	110	110	24	42	43	15	44	44	12
	1b	128	124	16	46	44	10			
	2a	71	72	15	42	43	15	42	42	16
	2b	120	119	27	42	42	16			
	3a	93	106	14	41	48	11	43	46	11
	3b	102	101	16	45	44	11			
		624	622	112	44%	43%	13%			
					S. D. = 2.08—2.16—2.38—1.29—1.92—2.16					
					P. E. = 1.54—1.59—1.76—1.06—1.58—1.78					

SUMMARY OF VII

a1	900	905	145	44	44	12
a2	571	608	110	42	45	13
a3	611	646	110	42	45	13
a4	570	581	117	42	43	15
a5	624	622	112	44	43	13
	3276	3362	594	43%	44%	13%
				S. D. = 1.00—0.89—1.00		
				P. E. = 0.75—0.68—0.75		

FIG. 18





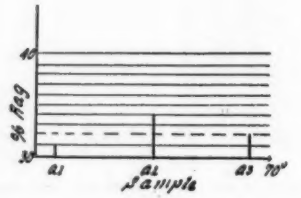
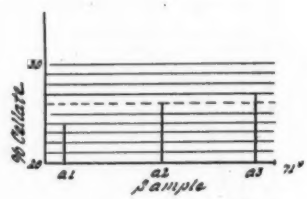


FIG. 19



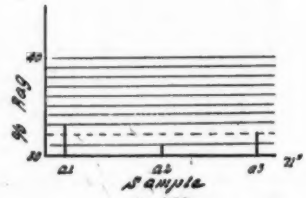


FIG. 20

STANDARD DEVIATION AND PROBABLE ERROR OF THE WHOLE FIELD OF VII

Unbleached Sulphite
Single Field
S. D. = 2.21 P. E. = 1.51
Deviations:
0%-10%, 1%-40%, 2%-23%, 3%-20%, 4%-4%, and 6%-3% of number of calculations.
Two Fields
S. D. = 1.37 P. E. = 0.96
Deviations:
0%-27%, 1%-47%, 2%-20%, and 3%-6% of number of calculations.

Semibleached Kraft
Single Field
S. D. = 2.62 P. E. = 1.80
Deviations:
0%-27%, 1%-17%, 2%-17%, 3%-13%, 4%-20%, and 5%-6%, of number of calculations.
Two Fields
S. D. = 1.74 P. E. = 1.22
Deviations:
0%-20%, 1%-27%, 2%-40%, and 3%-13% of number of calculations.

Ground Wood
Single Field
S. D. = 2.81 P. E. = 1.93
Deviations:
0%-6%, 1%-17%, 2%-40%, 3%-20%, 40%-7%, and 6%-10% of number of calculations.
Two Fields
S. D. = 2.25 P. E. = 1.57
Deviations:
0%-7%, 1%-40%, 2%-20%, 3%-20%, 4%-7%, and 5%-6% of number of calculations.

TABLE XIII
VIII. UNBLEACHED AND BLEACHED SULPHITE

Sample	Slide	Count: Unbleached Sulphite	Count: Bleached Sulphite	Per Cent by Weight Unbleached Sulphite: One Field	Two Fields	
a1	1a	8	165	5	5	
	1b	12	252	5		
	2a	10	132	7	8	
	2b	16	188	8		
	3a	10	152	6	5	
	3b	8	191	4		
		64	1080			6%
				S. D. = 1.35		1.41
				P. E. = 1.00		1.17
a2	1a	19	224	8	8	
	1b	25	314	7		
	2a	19	259	7	7	
	2b	14	244	5		
	3a	6	165	4	6	
	3b	22	291	7		
		105	1497			7%
				S. D. = 1.52		0.82
				P. E. = 1.13		0.68
a3	1a	16	204	7	7	
	1b	11	149	7		
	2a	15	236	6	6	
	2b	22	275	7		
	3a	8	194	4	6	
	3b	19	197	9		
		91	1255			7%
				S. D. = 1.52		0.58
				P. E. = 1.13		0.48
a4	1a	14	310	4	5	
	1b	18	260	6		
	2a	14	245	5	6	
	2b	20	301	6		
	3a	16	270	5	6	
	3b	[illegible]	[illegible]	[illegible]		
		93	1629			
				S. D. = 0.71		0.58
				P. E. = 0.58		0.48
a5	1a	18	210	8	8	
	1b	22	284	7		
	2a	19	160	10	8	
	2b	11	191	5		
	3a	17	151	10	9	
	3b	17	208	8		
		104	1204			8%
				S. D. = 1.73		0.58
				P. E. = 1.43		0.48

SUMMARY OF VIII

a1	64	1080	6
a2	105	1497	7
a3	91	1255	7
a4	93	1629	5
a5	104	1204	8
	457	6625	6%
		S. D. = 1.18	
		P. E. = 0.89	

STANDARD DEVIATION AND PROBABLE ERROR OF THE WHOLE FIELD OF VIII

Unbleached Sulphite
Single Field
S. D. = 1.71 P. E. = 1.17
Deviations:
0%-13%, 1%-50%, 2%-27=, 3%-3%, and 4%-7% of number of calculations.
Two Fields
S. D. = 1.46 P. E. = 1.02
Deviations:
0%-20%, 1%-47%, 2%-27%, and 3%-6% of number of calculations.

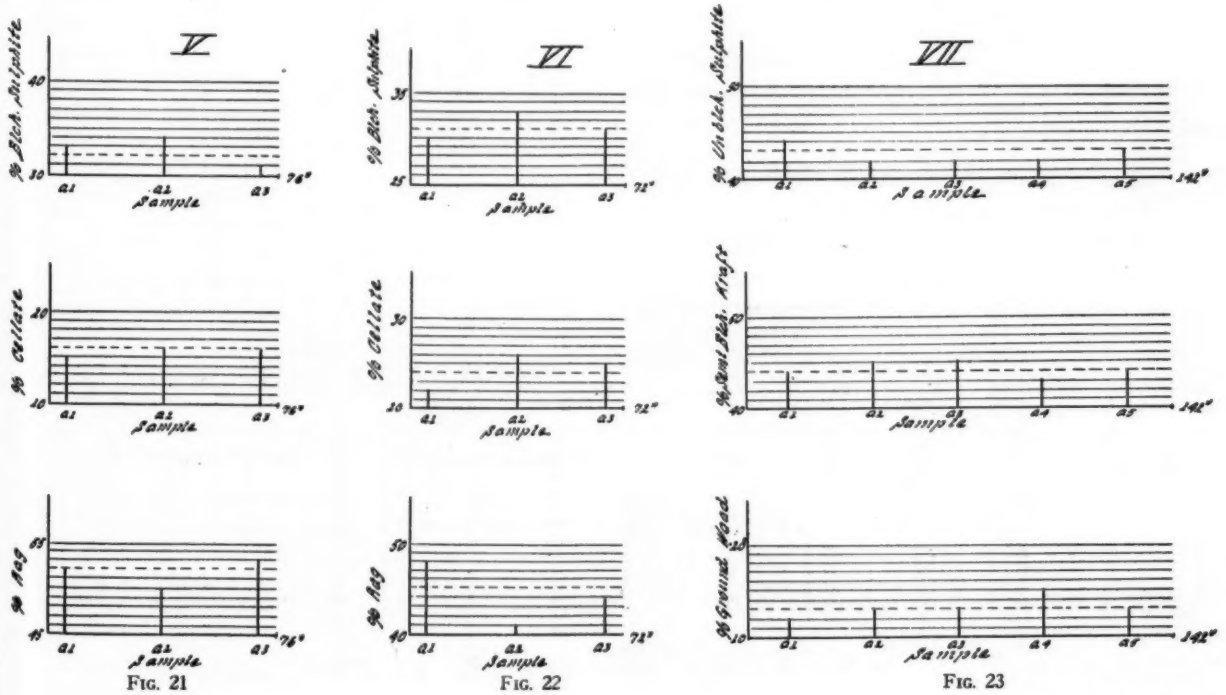


FIG. 21 FIG. 22 FIG. 23

TABLE XIV
IX. UNBLEACHED AND BLEACHED SULPHITE

Sample	Slide	Count: Unbleached Sulphite	Count: Bleached Sulphite	Per Cent by Weight Unbleached Sulphite: One Field	Two Fields	
a1	1a	17	136	11	13	
	1b	34	215	14		
	2a	22	145	13	14	
	2b	32	192	14		
	3a	23	127	15	14	
	3b	31	205	13		
		159	1020			14%
				S. D. = 1.41		0.58
				P. E. = 1.04		0.48
a2	1a	27	140	16	13	
	1b	10	119	8		
	2a	23	134	15	12	
	2b	26	243	10		
	3a	26	190	12	13	
	3b	24	151	14		
		136	977			12%
				S. D. = 2.86		0.82
				P. E. = 2.11		0.68
a3	1a	32	195	14	15	
	1b	45	239	16		
	2a	32	207	13	14	
	2b	23	131	15		
	3a	31	177	15	13	
	3b	23	197	10		
		186	1146			14%
				S. D. = 1.95		0.82
				P. E. = 1.45		0.68
a4	1a	44	257	15	14	
	1b	25	173	13		
	2a	26	156	14	15	
	2b	36	208	15		
	3a	20	213	9	13	
	3b	45	225	17		
		196	1232			14%
				S. D. = 2.48		0.82
				P. E. = 1.83		0.68
a5	1a	27	197	12	13	
	1b	20	127	14		
	2a	24	176	12	12	
	2b	27	205	12		
	3a	19	134	12	12	
	3b	22	165	12		
		139	1004			12%
				S. D. = 0.82		0.58
				P. E. = 0.60		0.48

SUMMARY OF IX

a1	159	1020	14
a2	136	977	12
a3	186	1146	14
a4	196	1232	14
a5	139	1004	12
	816	5379	13%
		S. D. = 1.00	
		P. E. = 0.75	

STANDARD DEVIATION AND PROBABLE ERROR FOR THE WHOLE WIDTH OF IX

Single Field
S. D. = 2.11 P. E. = 1.44
Deviations:
0%-14%, 1%-40%, 2%-23%, 3%-13%, 4%-7%, and 5%-3%, of number of calculations.

Two Fields
S. D. = 1.00 P. E. = 0.72
Deviations:
0%-40%, 1%-47%, and 2%-13% of number of calculations.

TABLE XV
X. BLEACHED SOFTWOOD SULPHITE AND GROUND WOOD

Sample	Slide	Count: Bleached Sulphite	Count: Ground Wood	Per Cent by Weight Bleached Sulphite: One Field	Two Fields	
a1	1a	138	108	44	47	
	1b	240	152	49		
	2a	146	114	44	43	
	2b	150	127	42		
	3a	151	125	42	44	
	3b	176	123	46		
		1001	749			45%
				S. D. = 2.48		1.73
				P. E. = 1.83		1.43
a2	1a	134	89	48	44	
	1b	125	112	40		
	2a	118	75	48	50	
	2b	162	92	52		
	3a	115	80	46	47	
	3b	120	80	47		
		774	528			47%
				S. D. = 3.58		2.45
				P. E. = 2.64		2.02
a3	1a	147	93	49	47	
	1b	133	96	46		
	2a	129	93	46	46	
	2b	121	83	47		
	3a	171	119	41	48	
	3b	165	97	50		
		866	581			47%
				S. D. = 2.94		0.82
				P. E. = 2.17		0.68
a4	1a	156	108	45	47	
	1b	172	110	49		
	2a	166	113	47	49	
	2b	173	102	50		
	3a	151	100	48	47	
	3b	160	109	47		
		978	642			48%
				S. D. = 1.63		1.00
				P. E. = 1.20		0.83
a5	1a	167	112	48	48	
	1b	229	151	48		
	2a	162	140	41	46	
	2b	210	129	49		
	3a	171	105	50	48	
	3b	158	107	47		
		1097	744			47%
				S. D. = 2.91		1.00
				P. E. = 2.15		0.83

SUMMARY OF X

a1	1001	749	45
a2	774	528	47
a3	866	581	47
a4	978	642	48
a5	1097	744	47
	4716	3244	47%
		S. D. = 1.00	
		P. E. = 0.75	

STANDARD DEVIATION AND PROBABLE ERROR FOR THE WHOLE WIDTH OF X

Single Field
S. D. = 3.00 P. E. = 2.03
Deviations:
0%-17%, 1%-30%, 2%-17%, 3%-16%, 5%-10%, 6%-7%, and 7%-3% of number of calculations.

Two Fields
S. D. = 1.86 P. E. = 1.30
Deviations:
0%-33%, 1%-33%, 2%-7%, 3%-20%, and 4%-7% of number of calculations.

TABLE XVI
SUMMARY OF DEVIATIONS AND PROBABLE ERROR UNBLEACHED AND BLEACHED SULPHITE

Single Field % Deviation	Frequency	Per Cent	Frequency x δ^2
0	20	13	0
1	45	30	45
2	32	21	128
3	25	17	225
4	16	11	256
5	9	5	225
6	1	1	36
7	1	1	48
8	1	1	64
	150		1027
		S. D. = 2.62	P. E. = 1.77
Two Fields			
0	21	28	0
1	26	35	26
2	18	24	72
3	8	10	72
4	0	0	0
5	1	1	25
6	1	1	36
	75		231
		S. D. = 1.76	P. E. = 1.19

TABLE XVII
SUMMARY OF DEVIATIONS AND PROBABLE ERROR SULPHITE, CELLATE, AND RAG

Sulphite: Single Field % Deviation	Frequency	Per Cent	Frequency x δ^2	Two Fields % Deviation	Frequency	Per Cent	Frequency x δ^2
0	6	8	0	0	6	17	0
1	21	29	21	1	15	43	15
2	15	21	60	2	2	5	8
3	16	22	144	3	7	19	63
4	3	4	48	4	5	14	80
5	7	9	175	5	1	2	25
					36		191
6	1	2	6	S. D. = 2.30		P. E. = 1.57	
7	1	2	7				
8	1	2	8				
9	0	0	0				
10	1	1	10				
	72		479				
S. D. = 2.58		P. E. = 1.75					

Sulphite

Single Field				Two Fields			
% Deviation	Frequency	Per Cent	Frequency x δ^2	% Deviation	Frequency	Per Cent	Frequency x δ^2
Cellate							
0	9	13	0	0	7	19	0
1	30	42	30	1	15	43	15
2	13	18	52	2	8	22	32
3	7	9	63	3	2	5	18
4	3	4	48	4	3	8	48
5	4	6	100	5	1	3	25
6	3	4	108				
7	3	4	147		36		138
	72		548				
	S. D. = 2.75		P. E. = 1.87		S. D. = 1.95		P. E. = 1.34
Rag							
0	9	12	0	0	10	28	0
1	18	25	18	1	8	22	8
2	15	21	60	2	5	14	20
3	9	12	81	3	6	17	54
4	8	11	128	4	1	3	16
5	4	6	100	5	5	14	125
6	6	8	216	6	0	0	0
7	2	3	98	7	1	2	49
8	1	2	64		36		272
	72		765				
	S. D. = 3.26		P. E. = 2.21		S. D. = 2.75		P. E. = 1.88

TABLE XVIII

SUMMARY OF DEVIATIONS AND PROBABLE ERROR SULPHITE AND GROUND WOOD

Single Field % Deviation	Frequency	Per Cent	Frequency x δ^2
0	7	14	0
1	16	32	16
2	10	20	40
3	9	18	81
4	1	2	16
5	4	8	100
6	2	4	72
7	1	2	49
	50		374
		S. D. = 2.74	P. E. = 1.87
Two Fields			
0	9	36	0
1	7	28	7
2	5	20	20
3	3	12	27
4	1	4	16
	25		70
		S. D. = 1.67	P. E. = 1.15

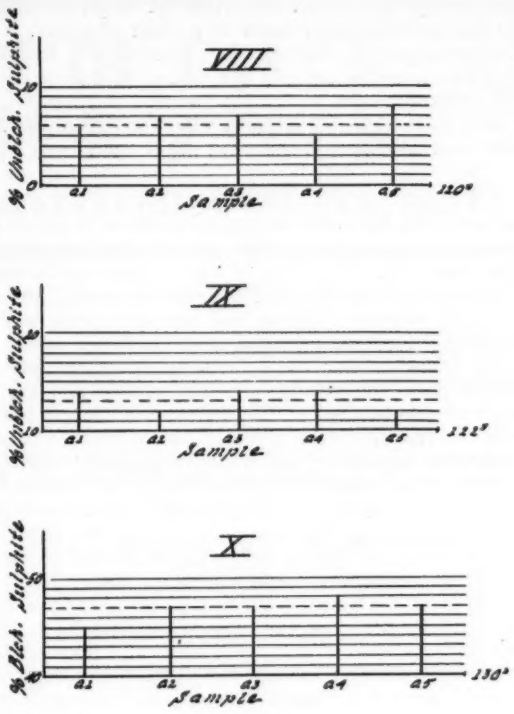


FIG. 24

good uniformity of the fiber furnish over the whole width of a sheet of paper, regardless of its fiber content, and that the probable error between the calculations for each

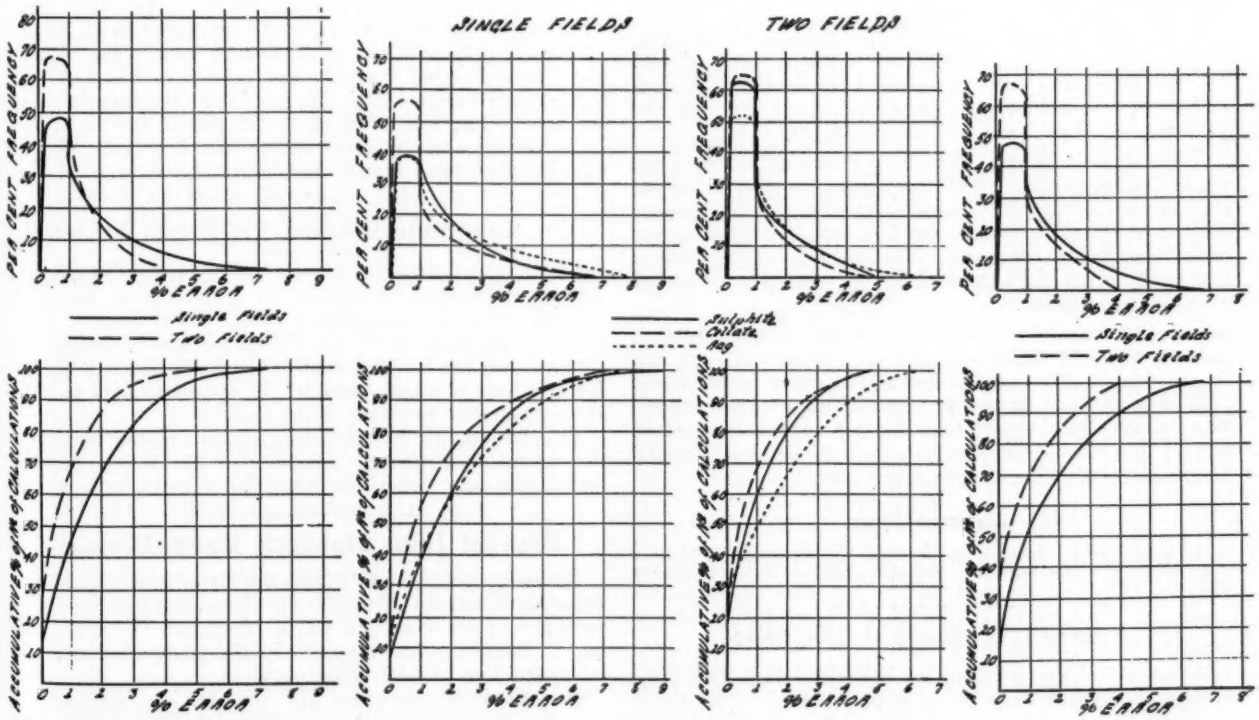


FIG. 25

Summary of per cent errors of unbleached and bleached sulphite.

FIG. 26

Summary of per cent errors of sulphite, cellate and rag.

FIG. 27

Summary of per cent errors of sulphite and ground wood.

sample always is less than between the single calculations made for an individual sample of a sheet of paper.

The accompanying histograms (Figs. 18, 19, 20, 21, 22, 23 and 24) show the relative per cent of each kind of fiber at the various places where the samples were taken, and they also show that the per cent variations from the average in most instances is less than 2 per cent.

Summary

To assemble final data on the accuracy with which such a fiber analysis can be made, all of the foregoing examples were put into three groups: One containing all the unbleached and bleached sulphite mixtures, one containing the sulphite, Cellate, and rag mixtures, and one containing the sulphite-ground wood mixtures made during this investigation. The frequencies of the per cent deviation from the average of each sample and the percentage of the number of this calculation were tabulated, as was the frequency times the square of this deviation.

From this tabulation, the standard deviation and probable error were calculated both for single and double fields and frequency charts of the per cent errors were made for each separate group.

These tables and charts (Fig. 25) show that in the unbleached and bleached sulphite group (Table XVI) the probable error for all of this was 1.77 per cent for a single field and 1.19 per cent for two fields, that most of the errors were between 0 and 1 per cent, and that in 80 per cent of the number of calculations (150) for a single field, the errors were less than 3 per cent and less than 2 per cent for two fields.

The sulphite, Cellate, and rag group (Table XVII) (Fig. 26) have a probable error which in no case is more than 2.21 per cent for a single field and 1.88 per cent for two fields. The largest number of errors are between 0 and 1 per cent and in 70 per cent of the number of calculations no error is more than 3 per cent for a single field and 2 per cent for two fields.

In the sulphite-ground wood pulp (Table XVIII) (Fig. 27), the probable error is 1.87 for a single field and 1.15 for two fields, and in 80 per cent of the number of calculations the per cent error is less than 3 per cent for one field and less than 2 per cent for two fields.

These results indicate that 70 per cent or more of the single calculations have less than 3 per cent error from the true average of the fiber composition of a sample of paper when a single field is used, and less than 2 per cent error when two fields are used. This would suggest that a greater accuracy than the usual 5 per cent plus or minus should be demanded.

If an analysis of two fields of a sample of fiber furnish is made and this varies only one or two per cent, one can be reasonably sure that the average of these two analyses will be within one or two per cent of the actual composition, which again shows that the per cent fiber mixture of a paper should be reported to the per cent actually found and not to the nearest 5 per cent.

Literature Cited

(1) Bright, C. G., "Preparation of Slides for Micro-chemical Paper—Fiber Analysis by the Estimation Method." Pulp and Paper, 14:615-616 (May 27, 1926).

Another Wheelright Dividend

Another dividend of Geo. W. Wheelwright & Co., Inc., is about to be paid, expected to be in the hands of creditors in the trade within the next ten days. When it is paid, the disbursement will amount to about 95 per cent of the total indebtedness.

TAPPI Notes

R. A. Masten formerly of the research department of the International Paper Company is now assistant manager of the Plattsburg, N. Y., mill of Berst-Forster-Dixfield Company.

E. O. Nash formerly of Miami Valley Coated Paper Company is now with the Appleton Coated Paper Company.

Paul Dieterle formerly with Louis De Jonge Company is now chief chemist for M. H. Birges Sons Company, Buffalo, N. Y. manufacturers of wall paper.

Walter T. Cusack has been transferred from the Livermore Falls, Maine mill of the International Paper Company to the Rumford mill of the Continental Paper and Bag Mills.

Lloyd L. Dodge is now with the Mid-West Wax Paper Company, Fort Madison, Iowa.

George Ritter formerly of the Island Paper Company is now general superintendent of the Bayless Paper Company of Austin, Pennsylvania.

Myrom Kuhlman is now with the Peavey Paper Products Company of Ladysmith, Wis.

The Empire State Book Company, 18 West 23rd street, New York has available for sale several copies of Dard Hunter's "Through Eighteen Centuries of Paper Making," at $7.50 per copy. This book formerly sold for $17.50.

New Paper Company Starting in Siam

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 3, 1935—The new paper company in Siam is slowly getting under way. Tenders for the necessary machinery, which have been received from five or six foreign firms are still under consideration. It is stated that the machinery selected must be capable of manipulating local raw materials, especially bamboo, and types not adapted to this purpose will be rejected. The company is organized as a private enterprise, with 80 per cent of the stock owned by the Government. The opinion is freely expressed among business men in Bangkok that the scheme is not a practicable one from a commercial point of view. The sale of stock to the public fell far below expectations and the Government was forced to take up considerably more than it had intended.

Dr. Langmuir Elected To Royal Society

Dr. Irving Langmuir, associate director of the General Electric Research Laboratory at Schenectady, has been elected to foreign membership in the Royal Society, England. Foreign membership, considered one of the highest honors that can be bestowed by British scientists on fellow workers in other countries, is limited to fifty persons throughout the world.

Dr. Langmuir, Nobel prize winner, is one of eight Americans now foreign members of the Royal Society, and is the only American industrial scientist so honored.

Brendel Joins Hancock Valve Division

Louis H. Brendel has joined the Consolidated Ashcroft Hancock Company, Bridgeport, Conn., as assistant sales manager of the Hancock Valve Division. He will assist M. S. Palmer, sales manager, in the promotion and sale of a new line of high quality valves.

For the past two years Mr. Brendel has been an account executive with the Sutherland-Abbott Advertising Agency, and prior to this he spent several years advertising and selling valves and industrial control equipment.

IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING JULY 6, 1935

CIGARETTE PAPER

M. Speigel & Son, Pr. Hayes, Genoa, 69 bls.; Liggett & Myers Tobacco Co., Liberty, Havre, 334 cs.; Champagne Paper Corp., Champlain, Havre, 38 cs.; Champagne Paper Corp., Pr. Roosevelt, Havre, 400 cs.; R. J. Reynolds Tobacco Co., Pr. Roosevelt, Havre, 59 cs.

WALL PAPER

———, Black Eagle, Antwerp, 1 cs., 1 ble.; ———, Bremen, Bremen, 2 cs.; Titan Shipping Co., Sagoporack, Gefle, 33 bxs.

WALL BOARD

Treetex Corp., Sagoporack, Ornskoldsvik, 2138 bdls.

NEWSPRINT

N. Y. Evening Journal, Markland, Liverpool, N. S. 402 rolls; N. Y. Tribune, Markland, Liverpool, N. S., 1396 rolls; World Telegram, Markland, Liverpool, N. S., 621 rolls; Brooklyn Daily Eagle, Markland, Liverpool, N. S., 395 rolls; Gilman Paper Co., Markland, Liverpool N. S., 369 rolls; Clinton Paper Corp., Markland, Liverpool, N. S., 80 rolls; Lunham & Reeve, Inc., Scanstates, Wiborg, 124 rolls; Daily Mirror, Inc., Queen Olga, Three Rivers, 684 rolls.

PRINTING PAPER

G. J. Fijux, Scanstates, Wiborg, 88 rolls.

PACKING PAPER

C. H. Powell Co., Capetown, Maru Hamburg, 16 rolls; C. Happel, Black Hawk, Rotterdam, 2 cs.; J. P. Heffernan Paper Co., Pr. Roosevelt, Hamburg, 9 bls.

WRAPPING PAPER

Walker Goulard Phehn Co., Scanstates, Helsingfors, 148 rolls.

FILTER PAPER

H. Reeve Angel & Co., Inc., Amer. Farmer, London, 13 cs.

DRAWING PAPER

Keuffel & Esser Co., Amer. Farmer, London, 1 cs.

METAL PAPER

K. Pauli Co., Hamburg, Hamburg, 12 cs.

SURFACE COATED PAPER

Gevaert Co. of America, Westernland, Antwerp, 9 cs.; Globe Shipping Co., Bremen, Bremen, 11 cs.; C. Happel, Pr. Roosevelt, Hamburg, 1 cs.

BASIC PAPER

P. Puttman, Westernland, Antwerp, 14 cs.; Globe Shipping Co., Bremen, Bremen, 10 crates; Dingelstedt & Co., Bremen, Bremen, 18 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., American Importer, Liverpool, 29 cs. (duplex).

DECALCOMANIAS

Sellers Transportation Co., Bremen, Bremen, 21 cs.; L. A. Consmiller, Hamburg, Hamburg, 8 cs.

TRANSFER PICTURES

Rohner Gehrig & Co., Bremen, Bremen, 2 cs, 3 bls.

TRANSFER PAPER

Hensel Bruckman & Lorbacher, Hamburg, Hamburg, 16 cs.

TISSUE PAPER

Jay Madden Corp., Hamburg, Hamburg, 46 bbls.

WRITING PAPER

Globe Shipping Co., Pr. Roosevelt, Hamburg, 1 cs.

MISCELLANEOUS PAPER

Japan Paper Co., Pr. Hayes, Genoa, 4 cs.; F. L. Kramer & Co., Gripsholm, Gothenburg, 169 bls., 182 rolls; The Borregaard Co., Inc., Gripsholm, Gothenburg, 114 bls., 860 rolls; Guaranty Trust Co., Gripsholm, Gothenburg, 1968 rolls; National Pulp & Paper Co., Gripsholm, Gothenburg, 178 bls., 2474 rolls; R. Wilson Paper Corp., Caledonia, Glasgow, 17 bls., 23 cs.; Coty Processing Co., Champlain, Havre, 3 cs.; Keuffel & Esser Co., Pr. Roosevelt, Hamburg, 28 rolls, 9 cs.

RAGS, BAGGINGS, ETC.

Philadelphia National Bank, Pr. Hayes, Bombay, 150 bls. cotton waste; E. J. Keller Co., Inc., Pr. Hayes, ———, 157 bls. rags; Chase National Bank, Amer. Importer, Manchester, 16 bls. old strings; Royal Manfg. Co., Amer. Importer, Manchester, 50 bls. cotton waste; S. Birkenstein & Son, Exiria, Barcelona, 234 bls. rags; S. Birkenstein & Son, Exiria, Barcelona, 64 bls. bagging; Loumar Textile By Products Co., Pulaski, Gdynia, 17 bls. cotton waste; Loumar Textile By Products Co., Pulaski, Gdynia, 75 bls. jute waste; W. Steck & Co., Black Eagle, Antwerp, 95 bls. jute waste; Darmstadt Scott & Courtney, Black Eagle, Antwerp, 120 bls. jute waste; E. J. Keller Co., Inc., Tonsbergfjord, ———, 24 bls. rags; ———, Tonsbergfjord, Barcelona, 213 bags old pickers; M. Sinkowitz & Sons, Tonsbergfjord, Barcelona, 140 bls. rags; Bank of N. Y. Trust Co., Tonsbergfjord, Barcelona, 81 bls. rags; H. Schimmel, Bordeaux, Maru Osaka, 40 bls. cotton waste; H. Schimmel, Bordeaux, Maru Kobe, 350 bls. cotton waste; Globe Sanitary Rag Co., Bordeaux, Maru Kobe, 55 bls. rags; Empire Sanitary Rag Co., Bordeaux, Maru Kobe, 30 bls. rags; E. J. Keller Co., Inc., Navemar, ———, 117 bls. rags; S. Birkenstein & Son, Navemar, Barcelona, 290 bls. rags; S. Birkenstein & Son, Navemar, Barcelona, 101 bls. bagging; Amtorg Trading Corp., Scanstates, Leningrad, 1004 bls. flax waste; Castle & Overton, Inc., Monfiore, Genoa, 3 bls. rags; Banco Coml. Italiane

Trust Co., Monfiore, Genoa, 54 bls. rags..

GLUE STOCK, ETC.

Banco Coml. Italiane Trust Co., Navemar, Barcelona, 60 bls. glue stock; ———, Hamburg, Hamburg, 320 bags hide glue.

OLD ROPE

W. Steck & Co., Exiria, Genoa, 96 coils; S. Birkenstein & Son, N. Y. City, Bristol, 64 coils; G. W. Millar & Co., Inc., N. Y. City, Bristol, 88 coils.

CASEIN

Swift & Co., Southern Cross, B. Ayres, 300 bags; ———, Hamburg, Hamburg, 60 bags.

WOOD PULP BOARDS

Leo E. Oliver, Gripsholm, Gothenburg, 35 bls.; Lagerloef Trading Co., Scanstates, Wiborg, 14 rolls, 265 bls.; Griffin, Rutgers, Inc., Hamburg, Hamburg, 55 cs.

WOOD PULP

———, Gripsholm, Gothenburg, 250 bls. sulphite; Gottesman & Co., Inc., Gripsholm, Gothenburg, 1800 bls. sulphate; A. Giese & Son, Black Hawk, Rotterdam, 50 bls. wood pulp, 2 tons; Lagerloef Trading Co., Scanstates, Wiborg, 120 bls. sulphate, 20 tons; Lagerloef Trading Co., Helsingfors, 152 bls. sulphite, 25 tons; Lagerloef Trading Co., Scanstates, Helsingfors, 624 bls. mechanical pulp, 124 tons; M. Sone, Scanstates, Helsingfors, 250 bls. mechanical pulp, 50 tons; Atterbury Bros., Inc., Scanstates, Helsingfors, 450 bls. wet pulp, 85 tons; Brown Bros. Harriman & Co., Sagoporack, Ornskoldsvik, 612 bls. chemical pulp, 100 tons; Price & Pierce, Ltd., Sagoporack, Orviken, 600 bls. chemical pulp, 101 tons; Price & Pierce, Ltd., Sagoporack, Hernosand, 10,800 bls. sulphate, 1800 tons; Price & Pierce, Ltd., Sagoporack, Hernosand, 450 bls. sulphite, 75 tons; Pagel Horton & Co., Inc., Sagoporack, Gefle, 750 bls. sulphate, 152 tons; Pagel Horton & Co., Inc., Sagoporack, Gefle, 375 bls. sulphite, 76 tons; Stora Kopparberg Corp., Sagoporack, Gefle, 300 bls. dry pulp, 60 tons; ———, Sagoporack, Gefle, 250 bls. sulphite, 50 tons; Lagerloef Trading Co., Sagoporack, Helsingfors, 130 bls. mechanical pulp, 26 tons; M. Sone, Sagoporack, Helsingfors, 415 bls. wood pulp, 83 tons; E. J. Keller Co., Inc., Hamburg, ———, 334 bls. wood pulp, 50 tons; Castle & Overton, Inc., Hamburg, Hamburg, 330 bls. wood pulp, 66 tons; Bank of N. Y. Trust Co., Hamburg, Hamburg, 170 bls. wood pulp, 34 tons; M. Sone, Pr. Roosevelt, Hamburg, 500 bls. wood pulp; ———, Pr. Roosevelt, Hamburg, 122 bls. wood pulp, 13 tons.

NEWARK IMPORTS

WEEK ENDING JULY 6, 1935

Newark Evening News, Donpaco, Donnacona, 302 rolls newsprint.

ALBANY IMPORTS

WEEK ENDING JULY 6, 1935

International Paper Co., St. Therese, Douglastown, N. B., 1700 cords pulpwood.

PORTLAND IMPORTS

WEEK ENDING JULY 6, 1935

Gottesman & Co., Inc., Ragnhildsholm, Sweden, 2500 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING JULY 6, 1935

Lucas Henkels Co., Black Eagle, Antwerp, 5 bls. rags; ———, Black Eagle, Antwerp, 36 bls. rags; E. Butterworth & Co., Inc., Black Eagle, Antwerp, 17 bls. flax waste; E. Butterworth & Co., Inc., Black Eagle, Antwerp, 76 bls. bagging; ———, Scythia, Liverpool, 288 bags hide cuttings; G. F. Malcolm, Inc., Scythia, Liverpool, 11 cs. tissue paper; ———, Scythia, Liverpool, 21 bls. rags.

PHILADELPHIA IMPORTS

WEEK ENDING JULY 6, 1935

Philadelphia National Bank, Black Eagle, Antwerp, 150 bls. rags; Castle & Overton, Inc., Black Eagle, Antwerp, 106 bls. rags; ———, Black Eagle, Antwerp, 270 bls. rags; F. Weber Co., Black Eagle, Antwerp, 1 cs. drawing paper; E. J. Keller Co., Inc., Black Eagle, ———, 50 bls. rags; Corn Exchange Bank Trust Co., Bordeaux, Maru Osaka, 50 bls. cotton waste; Royal Manfg. Co., Bordeaux, Maru Osaka, 50 bls. cotton waste; National Wiping Cloth Co., Bordeaux, Maru Kobe, 100 bls. rags; American Cotton Products Co., Bordeaux, Maru Kobe, 50 bls. cotton waste; Castle & Overton, Inc., Scanstates, Wiborg, 812 bls. wood pulp, 158 tons; Lagerloef Trading Co., Scanstates, Wiborg, 262 bls. sulphate, 52 tons; Lagerloef Trading Co., Scanstates, Wiborg, 985 bls. sulphite, 186 tons; Lagerloef Trading Co., Scanstates, Wiborg, 168 bls. wood pulp boards, 25 tons; Wilkinson Bros. & Co., Inc., Scanstates, Wiborg, 75 rolls newsprint; J. W. Hampton, Jr. Co., Scanstates, Wiborg, 70 rolls newsprint; Jay Madden Corp., Scanstates, Helsingfors, 188 rolls wrapping paper; Pagel Horton & Co., Inc., Sagoporack, Husum, 6140 bls. sulphate, 1000 tons; Pagel Horton & Co., Inc., Sagoporack, Gefle, 400 bls. sulphate, 81 tons; Stora Kopparberg Corp., Sagoporack, Gefle, 750 bls. dry pulp, 152 tons; Philadelphia Inquirer Co., Queen Olga, Three Rivers, 1381 rolls newsprint; ———, Queen Olga, Port Alfred, 1001 rolls newsprint; Gilman Paper Co., Queen Olga, Port Alfred, 1490 rolls newsprint.

WILMINGTON IMPORTS

WEEK ENDING JULY 6, 1935

Castle & Overton, Inc., Scanstates, Wiborg, 4224 bls. wood pulp, 844 tons; Jay Madden Corp., Scanstates, Wiborg, 122 rolls newsprint; Lagerloef Trading Co., Scanstates, Wiborg, 3633 bls. sulphite, 719 tons; Lagerloef Trading Co., Scanstates, Helsingfors, 155 bls. sulphite, 26 tons; Brown Bros. Harriman & Co., Sagoporack, Kopmanholmen, 1224 bls. chemical pulp, 200 tons; Price & Pierce, Ltd., Sagoporack, Orviken, 3900 bls. chemical pulp, 660 tons.

BALTIMORE IMPORTS

WEEK ENDING JULY 6, 1935

Congoleum Nairn Co., Exiria, Marseilles, 298 bls. rags; Congoleum Nairn Co., Liberty, Havre, 224 bls. rags; Congoleum Nairn Co., Liberty, Dunkirk, 59 bls. rags; ———, Queen Olga, Port Alfred, 2719 rolls newsprint.

NEW ORLEANS IMPORTS

WEEK ENDING JULY 6, 1935

Gottesman & Co., Inc., Dalhem, Sweden, 600 bls. wood pulp.

GALVESTON IMPORTS

WEEK ENDING JULY 6, 1935

Ayres W. C. Jones Co., Bordeaux, Maru Kobe, 50 bls. cotton waste.

HOUSTON IMPORTS

WEEK ENDING JULY 6, 1935

Southern Bagging Co., Bordeaux, Maru Kobe, 1600 bls. bagging.

MONTREAL IMPORTS

WEEK ENDING JULY 6, 1935

Gottesman & Co., Inc., Beaverdale, Czecho-Slovakia. 3336 bls. wood pulp.

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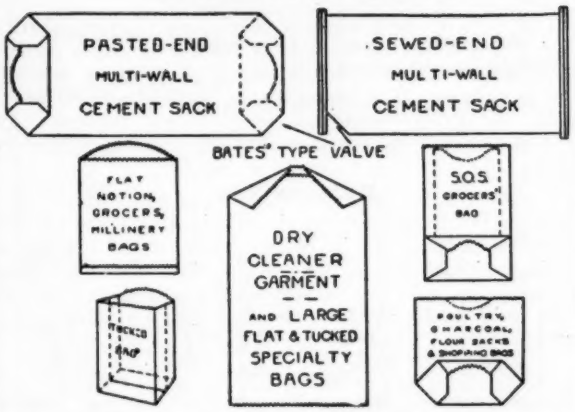
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Bruckiava, Czecho-Slovakia
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Svanö, Sweden

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, July 10, 1935.

Trading in the local paper market continues fairly active, despite the torrid weather. Demand for the various standard grades of paper is more persistent than in the corresponding period last year. Sales forces of the leading paper organizations are generally optimistic over the future. Prices are holding to schedule, in most instances.

The newsprint paper market is exhibiting a stronger undertone and there is an undercurrent of feeling that the price situation will be ironed out in the near future. Manufacturing operations are being maintained in sufficient volume to take care of current requirements. Stocks at the mills are not excessive.

Conditions in the fine paper market are fairly satisfactory. Demand for book, cover, writing and ledger papers is seasonal. Prices remain unchanged. Tissues are moving in good volume. The coarse paper market is moderately active. Kraft specialties are in persistent request. As usual at this time of the year, the paper board market is quiet.

Mechanical Pulp

The ground wood pulp market is showing signs of improvement. Production in North America and abroad is practically keyed to production and there are no undue accumulations, with the result that the statistical position of the industry is sound. Prices are generally holding to formerly quoted levels and shading is infrequent.

Chemical Pulp

Demand for the various domestic and imported grades of chemical pulp is holding up well. Supplies are going forward into consumption in good volume for the time of year. Kraft pulp continues very firm. Sulphite pulp is also displaying strength. Other grades are steady. The price situation remains unchanged.

Old Rope and Bagging

The old rope market is listless. Paper mill demand for foreign and domestic old manila rope is light. Small mixed rope is moving slowly. Prices remain unchanged. The bagging market is fairly steady, with scrap and gunny bagging in moderate request. Roofing bagging is fairly buoyant, with quotations firm.

Rags

Business in the domestic rag market is marking time. New cotton rags are attracting a fair amount of paper mill interest. Fancy shirt cuttings and No. 1 white shirt cuttings are in export request. Roofing grades are somewhat firmer. No radical changes have transpired in the imported rag market.

Waste Paper

The position of the paper stock market is slightly better. Board mill demand for the lower grades of waste paper is fairly active and quotations on strictly folded news and No. 1 mixed paper are steadier than of late. Old kraft machine compressed bales are stronger. Hard and soft white shavings and hard white envelope cuttings are steady.

Twine

Steadiness prevails in the local twine market. Demand for the various varieties is well sustained. The movement into consumption is well up to average for the time of year. Despite the usual competition for desirable orders prices generally remain unaltered and there are few reports of concessions around.

CHICAGO DISPLAYS STEADINESS

(Continued from page 15)

of roofing papers, had the lowest 1934 accident frequency rate, the figure being 5.65. Bird & Son also boasted the lowest severity rate—0.20.

The Gardner-Denver Company, Quincy, Ill., has recently issued a comprehensive folder describing a new line of double suction, single stage, split case centrifugal pumps expected to be of interest to paper manufacturers. The new product is credited with compactness and high efficiency for general water supply in industrial plants. The pumps are designed for any type drive and diagrams and specifications are included to check the method of operation and results achieved.

July 19 is the date of the third of the series of golf outings arranged by Ben Babbitt, chairman, for the members of the Mid West division of the Salesmen's Association of the Paper Industry. The luncheon, golf and dinner will be held at the Bob O' Link Golf Club, with plenty of prizes for members and guests.

Swedish Timber and Wood Pulp Journal Celebrates Fiftieth Anniversary

The Swedish Timber and Wood pulp Journal recently celebrated the 50 years' anniversary of its foundation, as the first number of the journal was issued May 4, 1885. It is thus one of the oldest Swedish trade journals. It is also one of the few Swedish papers that have international circulation, as the articles of the journal also are written in the English and French languages.

To celebrate its 50th anniversary the journal has issued a jubilee number with 208 pages, among other things dealing with the history of the journal from its foundation up to the present. Besides this the Swedish timber, wood pulp and paper industries of the last 50 years are interviewed. The jubilee number also contains a survey of the timber, wood pulp and paper industries of 1934 with statistical figures. There are also descriptions of new mills and technical novelties in these branches.

The jubilee issue may be ordered from A/B Svensk Trävaru Tidning, Kungsgatan 17, Stockholm, at a price of 3/6 d, postfree.

Gustavus J. Esselen, Inc. Moves

Gustavus J. Esselen, Inc., chemical research and development, announces the removal of its laboratories and offices to larger quarters at 857 Boylston street, Boston.

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TANK and SILO COMPANY
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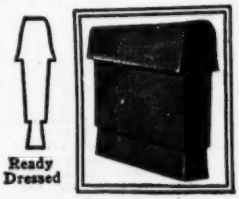

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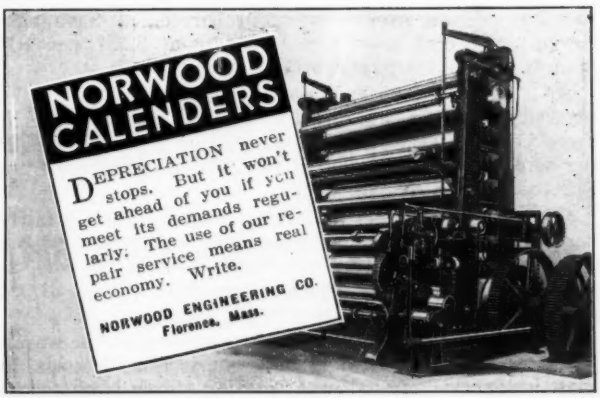
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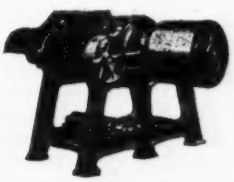

TAYLOR, STILES & COMPANY
RIEGELSVILLE, N. J.

Miscellaneous Market

Office of the PAPER TRADE JOURNAL,
Wednesday, July 10, 1935.

BLANC FIXE.—The blanc fixe market is fairly active. Prices are generally holding to formerly quoted levels. The pulp is quoted at from 42.50 to 45 per ton, in bulk; while the powder is selling at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER.—Conditions in the bleaching powder market are fairly satisfactory. Contract shipments are normal for the time of year. Prices are steady and unchanged. Bleaching powder is quoted at from 1.90 to $2.15 per 100 pounds, in drums, at works.

CASEIN.—The casein market is quiet. Domestic standard ground is quoted at 10¾ and finely ground at 11¼; Argentine standard ground at 13¼ and finely ground at 13½; French standard at 13½ and finely ground at 13¾ cents per pound, in bags, car lot quantities.

CAUSTIC SODA.—Some improvement is noticed in the caustic soda market. The contract movement is well up to average. Solid caustic soda is quoted at from $2.60 to $3.10; while the flake and ground are selling at from $3 to $3.05 per 100 pounds, in drums, at works.

CHINA CLAY.—The china clay market is marking time, although demand from the mills is fairly active. Imported china clay is quoted at from $13.50 to $21 per ton, ship side; while domestic paper making clay is selling at from $6.50 to $12 per ton, at mine.

CHLORINE.—Demand for chlorine continues fairly persistent. The contract movement is regular. Prices are holding to schedule without difficulty. Chlorine is quoted at from $2 to $2.40 per 100 pounds, in tanks, or multi-unit cars, in ton lots, or over, at works.

ROSIN.—The rosin market is easier. Paper making gum rosin is now quoted at $4.20 and wood rosin at $4.20 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent rosin size is selling at $2.51 per 100 pounds, in tank cars, at works.

SALT CAKE.—Steadiness prevails in the salt cake market. Prices remain unchanged. Salt cake is quoted at from $12 to $13, and chrome salt cake at from $11 to $12 per ton, at works. Imported salt cake is selling at from $12 to $13 per ton, on dock.

SODA ASH.—Paper mill demand for soda ash is fairly persistent. Contract shipments are moving in good volume for the season. Quotations on soda ash, in car lots, at works, per 100 pounds, are still as follows: in bulk; $1.05; in bags, $1.20; and in barrels, $1.50.

STARCH.—No radical changes transpired in the starch market. Prices are holding to formerly quoted levels, in most instances. Special paper making starch is quoted at $3.59 per 100 pounds, in bags; and at $3.86 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—The sulphate of alumina market is exhibiting a strong undertone. Prices are holding to schedule. Commercial grades are quoted at from $1.35 to $1.50; while iron free is selling at from $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR.—The sulphur market is steady. Sulphur is quoted at $18 per long ton on orders of 1,000 tons, or over, on yearly contracts; and at $20 per ton on any smaller quantity over that period. On spot and near by car loads, the quotation is $21 per ton.

TALC.—Most of the business transacted in the talc market is routine. Prices are generally holding to schedule. Domestic talc is quoted at from $16 to $18 per ton, at eastern mines; while imported talc is selling at from $23 to $30 per ton, on dock.

Market Quotations

Paper

(F. o. b. Mill)

Ledgers	6.50	@	—
Bonds	6.00	@	—
Index	6.00	@	—
Writings—			
Extra Superfine	6.50	@	—
Superfine	6.25	@	—
Tub sized	5.75	@	—
Engine sized	5.50	@	—
Book, Cased—			
S. & S. C.	5.35	@	5.75
S. & S. C. Litho.	5.60	@	6.00
M. F.	5.10	@	5.50
Coated and Enamel	5.90	@	6.55
Coated Litho	5.90	@	6.55
Tissues—Per Ream—			
White No. 1	.82½	@	.85
White No. 2	.67½	@	—
Anti-Tarnish M. G. only	1.00	@	—
Colored	.85	@	—
Kraft	.70	@	—
Manila	.67½	@	.70
Manila—			
No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00
Butchers	4.00	@	4.50
Fibre Papers—			
No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75
Common Bogus	1.50	@	3.00
Screenings	2.50	@	3.50
Glassine—			
Bleached	.11	@	—
Unbleached	.09	@	—

(The following Quotations are Delivered New York)

News, per ton—			
Roll, contract	40.00	@	—
Rolls, spot	40.00	@	—
Sheets	45.00	@	—
Kraft—			
No. 1 Northern	4.12½	@	4.75
Standard	4.00	@	—
Southern	3.87½	@	—
Boards—per ton—			
News	32.50	@	35.00
Chip	30.00	@	32.50
Sgl. Mla. Ll. Chip	45.00	@	47.50
Jute Lined Chip	45.00	@	47.50
White Patent Coated	55.00	@	57.50
Binders Boards	67.00	@	75.00

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	21.00	@	22.00
Dry	21.00	@	22.00
(F.o.b. Mill)			
No. 1 Domestic and Canadian	18.00	@	24.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Division 1	2.60	@	—*
Division 2	2.55	@	—*
Division 3	2.50	@	—*
Prime Qualities—			
Class 1. All Prime Easy Bleaching	2.05	@	—*
Other Than Easy Bleaching—			
Class 2. Higher Than Standard	2.00	@	—*
Class 3, Standard	1.95	@	—*
Class 4. Lower than Standard	1.90	@	—
(On Dock, Atlantic Ports)			
Kraft No. 1	1.70	@	1.80
Kraft No. 2	1.50	@	1.60
(F.o.b. Pulp Mill)			
Kraft Domestic	1.70	@	2.35
(Delivered)			
Soda Bleached	2.50	@	—

*Add 60 Cents per short ton, dock charges, for Albany; $2.00 for Lake Ports East and $3.00 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	5.75	@	6.00
Silesias No. 1	3.75	@	4.00
New Unbleached	6.25	@	6.50
New Soft Blacks	3.00	@	3.25
Blue Overall	3.50	@	3.75
Fancy	2.50	@	2.75
Washables	1.75	@	2.00
Mixed Khaki Cuttings	3.00	@	3.25
O. D. Khaki Cuttings	3.75	@	4.00
Men's Corduroy	1.50	@	1.75
New Mixed Blacks	2.50	@	2.75

Old Rags

White, No. 1—			
Repacked	3.00	@	3.50
Miscellaneous	2.75	@	3.25
White, No. 2—			
Repacked	1.75	@	2.25
Miscellaneous	1.50	@	1.75
Thirds and Blues—			
Repacked	1.50	@	1.75
Miscellaneous	1.25	@	1.50
Black Stockings	2.50	@	3.00
Roofing Rags—			
No. 1	1.25	@	1.30
No. 2	1.10	@	1.15
No. 3	.95	@	1.00
No. 4	.95	@	1.00
No. 5A	.80	@	.85

Foreign Rags

New Rags

New Dark Cuttings	1.75	@	1.85
New Mixed Cuttings	1.80	@	1.90
New Light Silesias	3.75	@	4.00
Light Flannelettes	3.75	@	4.00
Unbleached Cuttings	6.50	@	6.75
New White Cuttings	6.50	@	6.75
New Light Oxfords	3.25	@	3.50
New Light Prints	2.75	@	3.00

Old Rags

No. 1 White Linens	7.50	@	8.00
No. 2 White Linens	6.50	@	7.00
No. 3 White Linens	4.50	@	5.00
No. 4 White Linens	2.25	@	2.50
No. 1 White Cotton	4.25	@	4.75
No. 2 White Cotton	3.25	@	3.75
No. 3 White Cotton	2.50	@	2.75
No. 4 White Cotton	1.90	@	2.15
Extra Light Prints	2.00	@	2.25
Ord. Light Prints	1.75	@	1.85
Med. Light Prints	1.55	@	1.65
Dutch Blue Cottons	1.75	@	1.85
French Blue Linens	2.30	@	2.40
German Blue Linens	2.15	@	2.25
German Blue Cottons	1.70	@	1.80
Checks and Blues	1.30	@	1.40
Linsey Garments	1.50	@	1.65
Dark Cottons	1.15	@	1.25
Old Shopperies	1.00	@	1.05
New Shopperies	.95	@	1.05
French Blues	1.70	@	1.80

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—			
Foreign	1.60	@	1.70
Domestic	1.45	@	1.55
Wool Tares, light	1.65	@	1.70
Wool Tares, heavy	1.75	@	1.80
Bright Bagging	1.65	@	1.70
Manila Rope—			
Foreign	1.85	@	2.00
Domestic	1.75	@	2.00
Small Mixed Rope	1.10	@	1.35
New Burlap Cut	2.00	@	2.35
Hessian Jute Threads—			
Foreign	2.60	@	2.75
Domestic	2.80	@	3.00

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.50	@	2.60
Ordinary Hard White No. 1	2.10	@	2.15
Hard White No. 2	1.90	@	2.00
Soft White No. 1	1.70	@	1.80
Flat Stock—			
Stitchless	.65	@	.75
Over issue Mag.	.65	@	.75
Solid Flat Book	.45	@	.50
Crumpled No. 1	.35	@	.40
Solid Book Ledger	1.50	@	1.65
Ledger Stock	1.00	@	1.10
New B. B. Chips	.30	@	.35
Manilas—			
New Env. Cut	1.70	@	1.80
New Cuttings	1.35	@	1.45
Print	Nominal		
Bogus Wrapper	.40	@	.50
Container	Nominal		
Old Kraft Machine—			
Compressed bales	1.10	@	1.20
News—			
Strictly Folded	.20	@	.25
No. 1 Mixed Paper	.20	@	—
No. 1 White News	1.20	@	1.30
Strictly Overissue	.60	@	.65

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No need to stop the machine when taking roll temperatures. The thermocouple strip of the Cambridge Surface Pyrometer conforms to the shape of the roller. Within five seconds a steady reading of temperature is obtained. The HAND MODEL is a self-contained instrument for use upon readily accessible moving rolls. The EXTENSION MODEL is used for those hard-to-reach surfaces. Both models are sturdy and accurate.

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Send for details of these instruments. They will help you to save money and make better paper.

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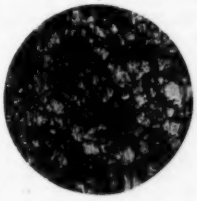
PROMAL
The Super-Service Cast
SPROCKET CHAIN



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The white areas represent soft metal. The black network structure indicates stronger, stiffer material, which acts as a reinforcement around the soft white portions, preventing their distortion under load, and so strengthening the material.

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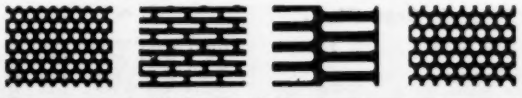
Of Stainless Steel—Copper—Bronze—Monel—Chemical Resisting Alloys
Perforations that are accurate in size
Any Metal Any Perforation



The Harrington & King PERFORATING Co.
5652 Fillmore St., Chicago, Ill. 114 Liberty St, New York, N.Y.

Twines

(F. o. b. Mill)

Coarse Polished—			
India	.11¼	@	.13¼
Belg. White Hemp	.12½	@	.15¾
India Compress	.11¼	@	.12¾
Fine Polished—			
Fine India	.19	@	.21
Special	.17	@	.19
B. C.	.23½	@	.27½
Unpolished—			
Box	.10	@	.10½
Paper Makers	.07	@	.12
Tube Rope	.08	@	.13½
Wall Paper	.09	@	.12½
Wrapping	.13	@	.18
Special	.13	@	—
Soft Fiber Rope	.10¼	@	.10¾

CHICAGO

Paper

(F. o. b. Mill)

Rag Bond	.12	@	.50
Water Marked Sulphite Bond	.06¾	@	.11
Sulphite Bond	.05½	@	.11
Superfine Writing	.18	@	.24
No. 1 M. F. Book	.06¼	@	.07¾
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¼	@	.07¾
No. 2 S.&S.C. Book	.05¼	@	.06½
Coated Book	.07	@	.12
Coated Label	.07	@	.08½
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¼	@	.05¾
No. 2 Manila	.04¾	@	.04¾
Butcher's Manila	.03¾	@	.03¾
No. 1 Kraft	4.75	@	5.00
Southern Kraft	3.90	@	4.35
No. 2 Kraft	3.88	@	4.35
Wood Tag Boards	.04¾	@	.06¼
Sulphite Screenings	.03	@	.03¾
Manila Tissue	.05¾	@	.07
White Tissue	.07	@	.09

(Delivered Central Territory)

News, per ton—			
Rolls, contract	41.00	@	—
Sheets, open	46.00	@	48.50
Boards, per ton—			
Plain Chip	46.50	@	—
Solid News	50.00	@	—
Manila Lined Chip	55.00	@	—
Patent coated	65.00	@	—
Container Lined—			
85 Test, per 1000 sq. ft.			1.70
100 Test, per 1000 sq. ft.			1.85

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope cuttings	1.70	@	2.00
No. 1 Hard White	1.40	@	1.65
No. 1 Soft White	1.25	@	1.50
Ledger & Writings	.70	@	.80
Solid Books	.60	@	.70
Blanks	1.00	@	1.05
Kraits	.80	@	.90
New Kraft Cuts	1.20	@	1.30
Manila Env. Cuts	1.25	@	1.30
Ex. No. 1 Manila	.90	@	1.00
Print Manila	.40	@	.50
Overissue News	.40	@	.45
Old Newspapers—			
No. 1	.30	@	.35
No. 1 Mixed Paper	.25	@	.30
Roofing Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper

(Delivered Philadelphia)

Bonds	.05-9/10	@	.38
Ledgers	.06 9/10	@	.40
Writings—			
Fine No. 3	.05	@	.06
Superfine	.10	@	.18
Extra Fine	.15	@	.26
Fine	.15	@	.26
Fine, No. 2	.10	@	.25
Book, M. F.	.05¼	@	.06¼
Book, S. S. & C.	.05½	@	.07½
Book, Coated	.06½	@	.09
Coated Lithograph	.06¾	@	.08½
Label	.07	@	.11
No. 1 Jute Manila	6.25	@	—
Manila Sul., No. 1	5.25	@	—
Manila No. 2	3.75	@	—
No. 1 Kraft	5.00	@	—
Southern Kraft	4.75	@	—
Common Bogus	.03	@	—
News Print Rolls	40.00	@	—
Straw Board	40.00	@	45.00
News Board	40.00	@	—
Chip Board	37.50	@	—
Wood Pulp Board	70.00	@	85.00
Binder Boards—			
No. 1, per ton	75.00	@	80.00
No. 2, per ton	70.00	@	75.00
Carload lots	65.00	@	70.00
Tarred Felts—			
Regular	32.25	@	34.25
Slaters (per roll)	.84	@	.94
Best Tarred, 1-ply (per roll)	1.95	@	2.10
Best Tarred, 2-ply (per roll)	1.40	@	1.75
Best Tarred, 3-ply	2.00	@	2.25

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.03½	@	.04
New White, No. 2	.02½	@	.04
Light Silesias	.02½	@	.03
Silesias, No. 1	.03	@	.03½
Black Silesias, soft	.02½	@	.03
New Unbleached	.05	@	.05½
Washable, No. 1	01½	@	.02
Blue Overall	.03½	@	.04
Cottons—According to grades—			
Washable, No. 2	.02½	@	.03
New Blue	.01½	@	.03
Fancy	.01½	@	.03
New Black Soft	.02	@	.04
New Light Seconds	.01½	@	.02
New Dark Seconds	1.50	@	1.75
Khaki Cuttings—			
No. 1 O.D.	.03	@	.04
No. 2 Mixed	.03	@	.04
Corduroy	.02	@	.03
New Canvas	.03½	@	.04½
New Black Mixed	.02½	@	.03½

Domestic Rags (Old)

White No. 1—			
Repacked	2.50	@	3.50
Miscellaneous	1.75	@	2.25
M. G.	3.00	@	3.75
Thirds and Blues—			
Miscellaneous	1.00	@	1.50
Repacked	1.50	@	2.00
Black Stockings (Export)	2.00	@	3.50
Roofing Stock—			
Foreign No. 1	.50	@	.75
Repacked	.70	@	.85

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.25	@	1.50
Domestic	1.50	@	1.75
Manila Rope	2.00	@	2.25
Sisal Rope	1.25	@	1.50
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	1.25	@	1.50
No. 2	.80	@	1.00
Wool Tares, heavy	1.75	@	—
Mixed Strings	1.15	@	1.30
No. 1 New Light Burlap	2.25	@	2.50
New Burlap Cuttings	2.00	@	2.25

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.25	@	2.30
No. 2 Hard White	1.90	@	2.00
No. 1 Soft White	1.80	@	1.85
No. 2 Soft White	1.25	@	1.30
No. 1 Mixed	—	@	.75
Solid Ledger Stock	1.50	@	1.60
Writing Paper	1.00	@	1.10
No. 1 Books, heavy	.55	@	.60
No. 1 New Manila	1.35	@	1.40
Print Manila	.50	@	.60
Container Manila	.45	@	.50
Old Kraft	1.00	@	—
No. 1 Mixed Paper	.20	@	—
Straw Board Chip	.20	@	—
Binders Board Chip	.20	@	—
Corrugated Board	.40	@	—
Overissue News	.50	@	—
Old Newspapers	.30	@	—

BOSTON

Paper

(F. o. b. Mill)

Ledgers—			
Sulphite	.06	@	.12½
Rag Content	.12	@	.30
All Rag	.36	@	.52½
Bonds—			
Sulphite	.07¾	@	.11
Rag Content	.12	@	.30
All Rag	.36	@	.65
Writings	.06½	@	.20
Superfines	.11	@	.31
Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¼	@	.06½
Manila, Sul. No. 2	.03¼	@	.04½
No. 1 Kraft	.04¾	@	.05
No. 2 Kraft	.04½	@	.04¾
(F. o. b. Boston)			
Southern Kraft	.03¾	@	.04¾
(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots.)			
Common Bogus	.02	@	.02¼
Delivered New England points)			
News Print Rolls	39.50	@	—
Straw Board, rolls	.009	—	@35.00
Straw Board in Sheets, basis 35s to 70s	—	@	40.00
Filled News Board	40.00	@	45.00
Chip Board	37.50	@	40.00
Chip Board (Creasing)	37.50	@	40.00
Single Manila Lined Chip	47.50	@	52.50
Single White, Patent Coated News Board (Bender)	55.00	@	65.00
Wood Pulp Board	70.00	@	75.00
Binder Boards (Standard Grade)	67.00	@	75.00

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.00	@	2.20
No. 1 Soft White	1.75	@	1.90
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.40	@	1.50
Overissue Ledger Stock	1.15	@	1.30
Mixed Ledgers	.85	@	.90
No. 1 Books, heavy	.55	@	.65
No. 1 Books, light	.50	@	.60
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.30	@	1.40
No. 1 Old Manila	.60	@	.65
White Blank News	1.15	@	1.20
No. 1 Kraft	.90	@	.95
Mixed Papers	.20	@	.22½
Print Manila	.40	@	.45
Container Manilas	.25	@	—
Overissue News	—	@	.35
Old Newspapers	.25	@	.27½
Box Board Chips	—	@	.25
Corrugated boxes	.32½	@	.37½
Screening Wrappers	.40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	1.80	@	1.90
Domestic	1.50	@	1.75
Transmission Rope	.90	@	1.00
Jute Rope	1.50	@	1.60
Jute Carpet Threads	.65	@	.70
Gunny No. 1—			
Foreign	1.85	@	—
Domestic	1.35	@	—
Bleachery Burlap	4.00	@	4.50
Scrap Burlap			
Foreign	1.75	@	1.85
Domestic	1.30	@	1.35
Scrap Sisal	1.05	@	1.15
Scrap Sisal for Shredding	1.10	@	1.25
Wool Tares, heavy	1.30	@	1.35
New Burlap Cuttings	1.60	@	1.75
Australian Wool Ponches	2.50	@	2.75
Heavy Baling Bagging	1.48	@	1.50
Paper Mill Bagging	1.10	@	1.25
Bagging No. 4	.70	@	.75

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.01¾	@	.02
New White No. 1	.05½	@	.06
New White No. 2	.03½	@	.04
Silesias No. 1	.04¼	@	—
New Black Silesias	.02	@	.03
Soft Unbleached	.05¾	@	.06½
Blue Cheviot	—	@	.04
Fancy	.0195	@	.021
Washable	.0165	@	.0170
Cottons—According to grades—			
Blue Overalls	.04	@	—
New Black, soft	.04	@	.05
Khaki Cuttings	.03½	@	.03¾
O. D. Khaki	.03	@	.03¼
Corduroy	.01¾	@	.04
New Canvas	—	@	.05
B.V.D. Cuttings	—	@	.04½
Paper Mill Bagging	1.10	@	1.25

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.25	@	1.50
Thirds and Blues			
Repacked	2.00	@	2.75
Miscellaneous	2.00	@	2.25
Black Stockings	2.50	@	3.00
Roofing Stock			
No. 1	1.20	@	1.25
No. 2	.95	@	1.00
No. 3	—	@	.65

Foreign Rags

(F. o. b. Boston)

Dark Cottons	1.30	@	—
New White Shirt Cuttings	5.50	@	6.00
Dutch Blues	2.00	@	2.50
New Checks & Blues	2.50	@	3.00
Old Fustians	1.75	@	—
Old Linsey Garments	—	@	1.75

TORONTO

Paper

(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.11	@	—
No. 2 Sulphite	.08½	@	—
No. 1 Colored	.12	@	—
No. 2 Colored	.09	@	—
Ledgers (sulphite)			
Ledgers, No. 1	.34½	@	—
Ledgers, No. 2	.25½	@	—
Writing	.09	@	.09½
Book—			
No. 1 M. F. (Carloads)	6.50	@	—
No. 2 M. F. (Carloads)	6.00	@	—
No. 3 M. F. (carloads)	5.00	@	—
No. 1 S. C. (carloads)	7.00	@	—
No. 2 S. C. (carloads)	6.50	@	—
No. 3 S. C. (carloads)	5.20	@	—
No. 1 Coated and Litho	12.00	@	—
No. 2 Coated and Litho	10.50	@	—
No. 3 Coated and Litho	9.50	@	—
Coated tinted	13.00	@	—
Wrapping—delivered			
Rag Brown	4.75	@	—
White Wrap	3.50	@	—
"B" Manila	5.25	@	—
No. 1 Manila	5.40	@	—
Fiber	5.40	@	—
Kraft, M. F.	5.90	@	—
Kraft No. 2	5.40	@	—

(F.O.B. Cars Toronto)

News, per ton—			
Rolls (contract)	39.50	@	—
Sheets	42.00	@	—

Pulp

(F. o. b. Mill)

Ground wood	27.00	@	—
Unbleached sulphite	42.00	@	—
Book (Class 1)	58.00	@	—
Writing (Class 2)	59.00	@	—
Select (Class 3)	60.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.00	@	2.30
Soft White	1.60	@	1.90
White Blk. News	1.25	@	1.40
Book and Ledger—			
Flat Magazine and Book Stock (old)	.90	@	1.00
Light and Crumpled Book Stock	.80	@	.90
Ledgers and Writings	1.00	@	1.05
Manilas—			
New Manila Cut	1.25	@	1.40
Printed Manilas	.50	@	.60
Kraft	1.00	@	1.60
News and Scrap			
Strictly Overissue	.60	@	—
Strictly Folded	.50	@	—
No. 1 Mixed Paper	.40	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.06	@	—
Fancy Shirt Cuttings	.02	@	—

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